US009792589B2

(12) **United States Patent**
Bedingfield, Sr.

(10) **Patent No.: US 9,792,589 B2**
(45) **Date of Patent: Oct. 17, 2017**

(54) **METHODS, SYSTEMS AND PRODUCTS FOR SYNCHRONIZING REMINDER ACKNOWLEDGEMENTS IN CALENDARING APPLICATIONS**

(75) Inventor: **James C. Bedingfield, Sr.**, Lilburn, GA (US)

(73) Assignee: **AT&T INTELLECTUAL PROPERTY I, L.P.**, Atlanta, GA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1167 days.

(21) Appl. No.: **13/040,518**

(22) Filed: **Mar. 4, 2011**

(65) **Prior Publication Data**

US 2011/0154207 A1 Jun. 23, 2011

Related U.S. Application Data

(63) Continuation of application No. 11/095,391, filed on Mar. 31, 2005, now Pat. No. 7,925,990.

(51) **Int. Cl.**

G06F 3/048	(2013.01)
G06F 15/00	(2006.01)
G06F 17/00	(2006.01)
G06Q 10/10	(2012.01)
H04L 12/18	(2006.01)

(52) **U.S. Cl.**

CPC ***G06Q 10/109*** (2013.01); ***H04L 12/1895*** (2013.01)

(58) **Field of Classification Search**

CPC H04M 1/72566; G06F 3/048; G06F 15/00; G06F 17/00

USPC 715/774

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,097,429	A	3/1992	Wood	
5,634,100	A	5/1997	Capps	
5,842,009	A	11/1998	Borovoy et al.	
5,855,006	A	12/1998	Huemoeller et al.	
5,884,306	A	3/1999	Bliss et al.	
5,970,466	A	10/1999	Detjen et al.	
6,205,448	B1 *	3/2001	Kruglikov et al.	
6,237,034	B1 *	5/2001	Fulford	H04L 41/0604 340/502
6,462,660	B1	10/2002	Cannon	
6,466,969	B1	10/2002	Bunney et al.	
6,504,908	B1	1/2003	Bellomo et al.	
6,587,036	B2	7/2003	Somers	
6,920,328	B2	7/2005	Wollrab	
6,970,698	B2	11/2005	Majmundar et al.	
7,188,073	B1 *	3/2007	Tam et al.	705/7.16
7,334,000	B2	2/2008	Chhatrapati et al.	
7,475,395	B2 *	1/2009	Etelapera	G06F 8/65 717/172

(Continued)

OTHER PUBLICATIONS

Talking Reminder user manual, published 2004, pp. 1-26.

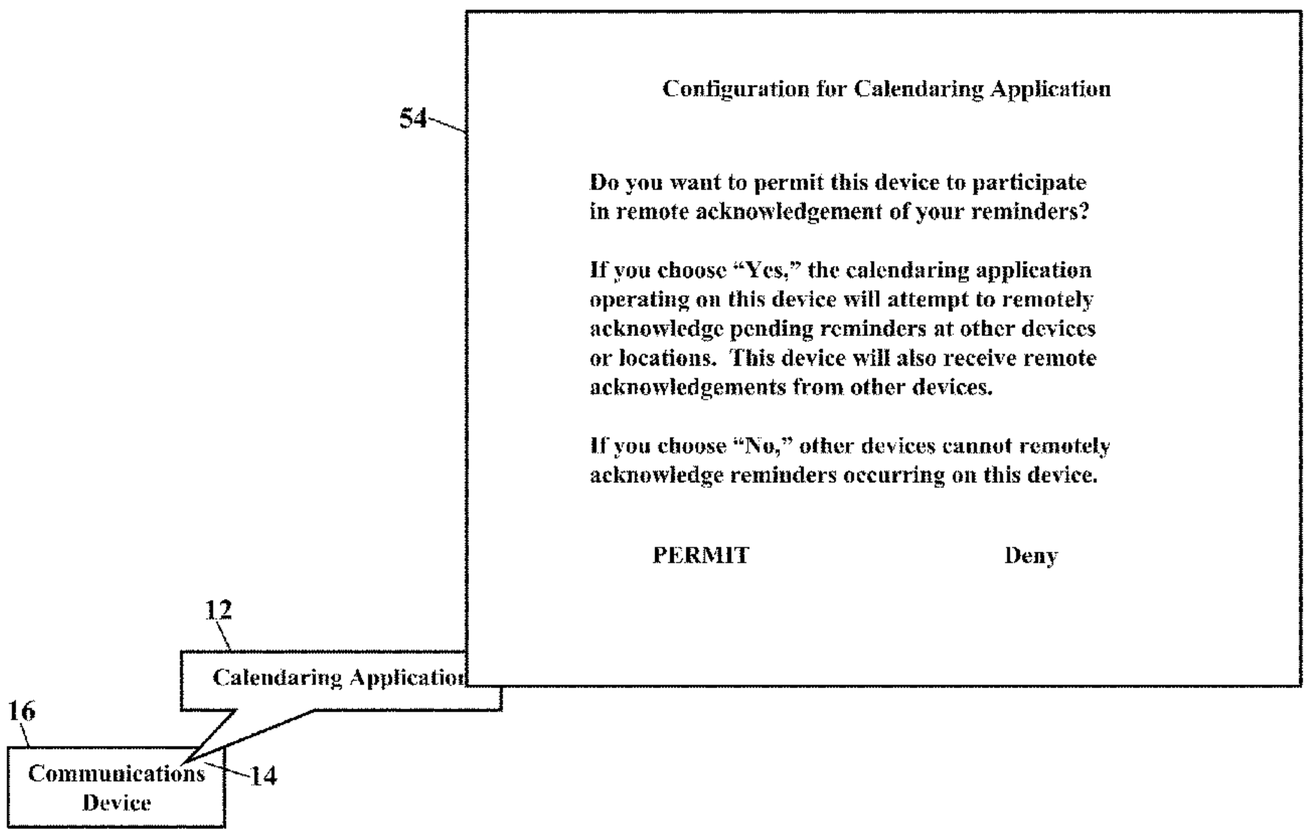
(Continued)

Primary Examiner — Jennifer To
Assistant Examiner — Hugo Molina
(74) *Attorney, Agent, or Firm* — Scott P. Zimmerman, PLLC

(57) **ABSTRACT**

Methods, systems, and products acknowledge a reminder in a calendaring application. When an acknowledgement of the reminder is received, a message is communicated to similarly acknowledge a pending reminder in another instance of the calendaring application.

8 Claims, 15 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

2001/0051935	A1*	12/2001	Sugiura	G06Q 10/10 706/12
2002/0024540	A1	2/2002	McCarthy	
2002/0076015	A1	6/2002	Norwitz et al.	
2002/0078007	A1*	6/2002	Herrero	707/1
2003/0005150	A1	1/2003	Thompson et al.	
2003/0097361	A1	5/2003	Huang et al.	
2003/0171973	A1	9/2003	Wilce	
2004/0024795	A1*	2/2004	Hind	G06F 17/30581
2004/0128093	A1*	7/2004	Cragun	G06Q 10/109 702/79
2004/0131050	A1	7/2004	Beringer et al.	
2004/0142711	A1*	7/2004	Mahonen et al.	455/502
2004/0199611	A1*	10/2004	Bernhard	H04L 41/0816 709/220
2004/0203644	A1*	10/2004	Anders	H04M 3/06 455/414.1
2004/0225718	A1*	11/2004	Heinzel	G06Q 10/107 709/206
2004/0243547	A1*	12/2004	Chhatrapati	G06F 17/30471
2005/0015483	A1*	1/2005	Carter et al.	709/224
2005/0041667	A1*	2/2005	Miller	G04G 21/00 370/395.4
2005/0060720	A1*	3/2005	Mayer	719/318
2005/0099963	A1*	5/2005	Multer	G06F 17/30174 370/254
2005/0166222	A1	7/2005	Tully, Jr. et al.	
2005/0187896	A1*	8/2005	Mousseau	G06F 9/542
2005/0210104	A1*	9/2005	Torvinen	G06Q 10/10 709/205
2006/0074844	A1	4/2006	Frankel et al.	
2006/0099945	A1*	5/2006	Helvick	H04M 1/72566 455/432.3
2006/0150175	A1	7/2006	Etelapera	
2006/0199611	A1*	9/2006	Eskelinen	H04M 1/72566 455/556.2
2006/0252435	A1	11/2006	Henderson et al.	
2009/0077601	A1	3/2009	Brailean et al.	

OTHER PUBLICATIONS

Gordon Padwick, ebook titled "Special Edition Using Microsoft Outlook 2002", published on May 17, 2001, pp. 1-42.

Microsoft Outlook 2003—Screen Captures from MS Office Outlook 2003 build 11.5608.5606—release Oct. 2003.

* cited by examiner

FIG. 1

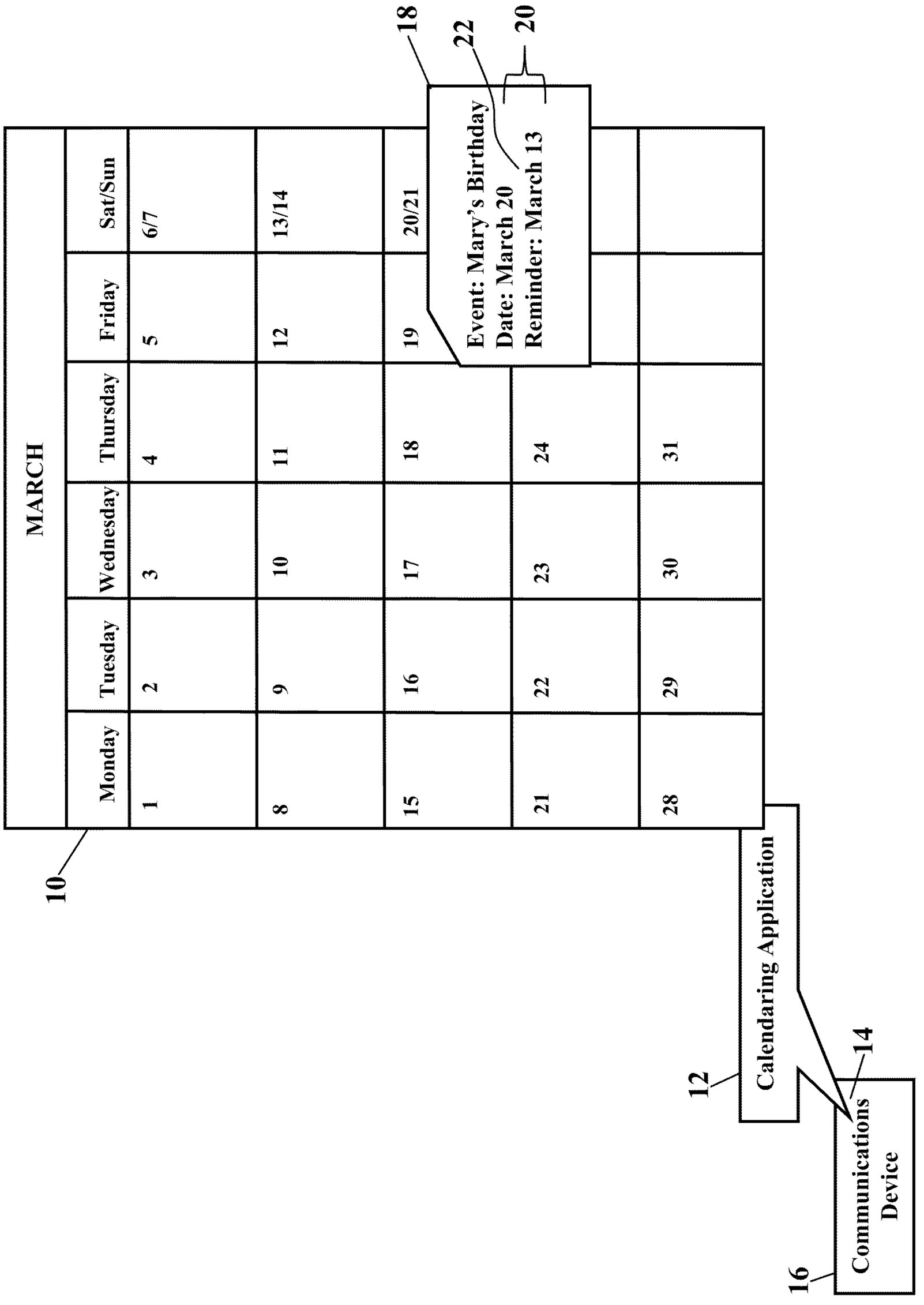

10
MARCH
Monday
Tuesday
Wednesday
Thursday
Friday
Sat/Sun
1
2
3
4
5
6/7
8
9
10
11
12
13/14
15
16
17
18
19
20/21
21
22
23
24
28
29
30
31
18
22
20
Event: Mary's Birthday
Date: March 20
Reminder: March 13
12
Calendaring Application
14
Communications Device
16

FIG. 2

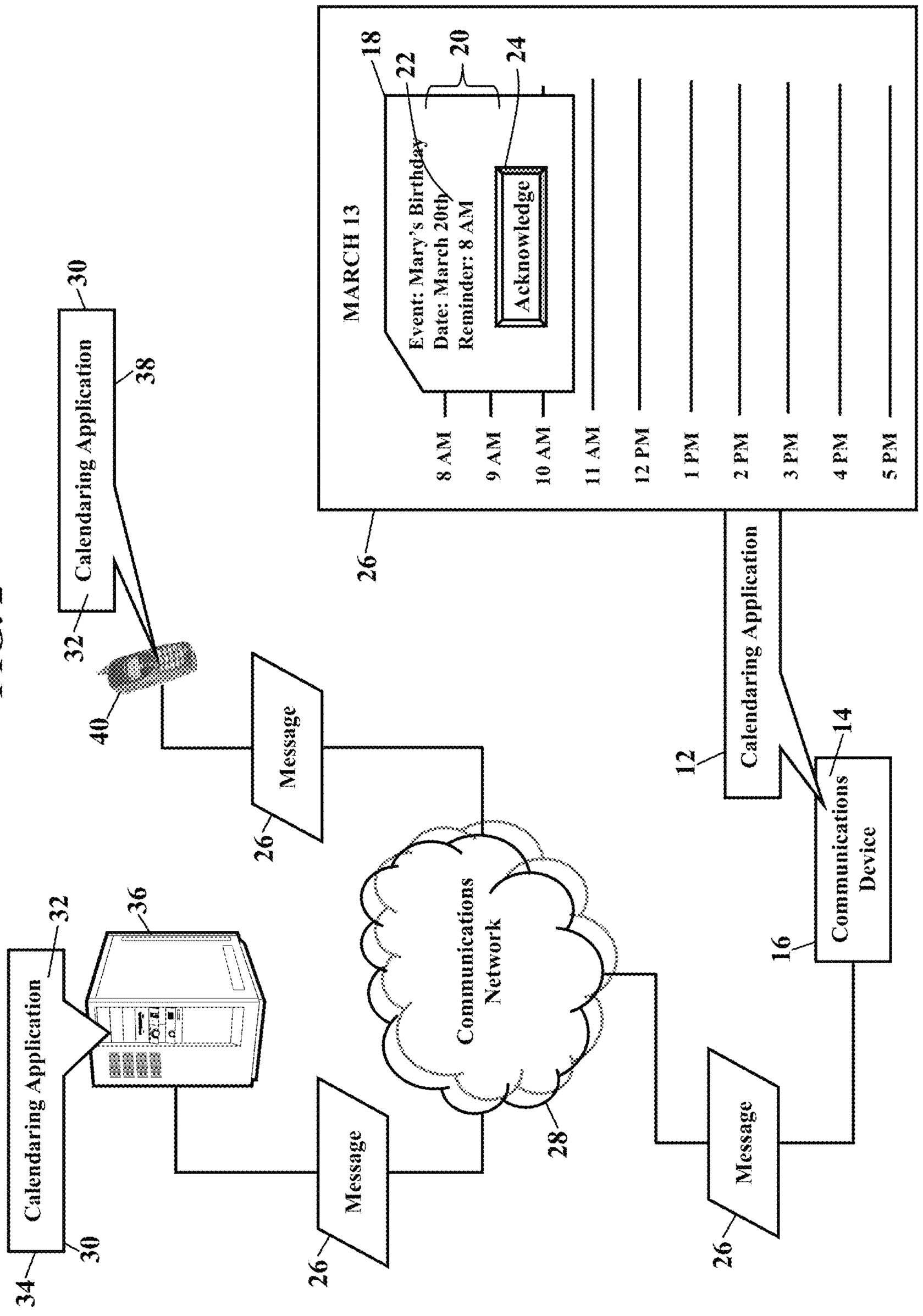

MARCH 13
18
22
20
24
Event: Mary's Birthday
Date: March 20th
Reminder: 8 AM
Acknowledge
8 AM
9 AM
10 AM
11 AM
12 PM
1 PM
2 PM
3 PM
4 PM
5 PM
26
Calendaring Application
12
Communications Device
14
16
Message
26
Communications Network
28
Message
26
Calendaring Application
32
30
Calendaring Application
32
30
34
36
40
Message
26

FIG. 3

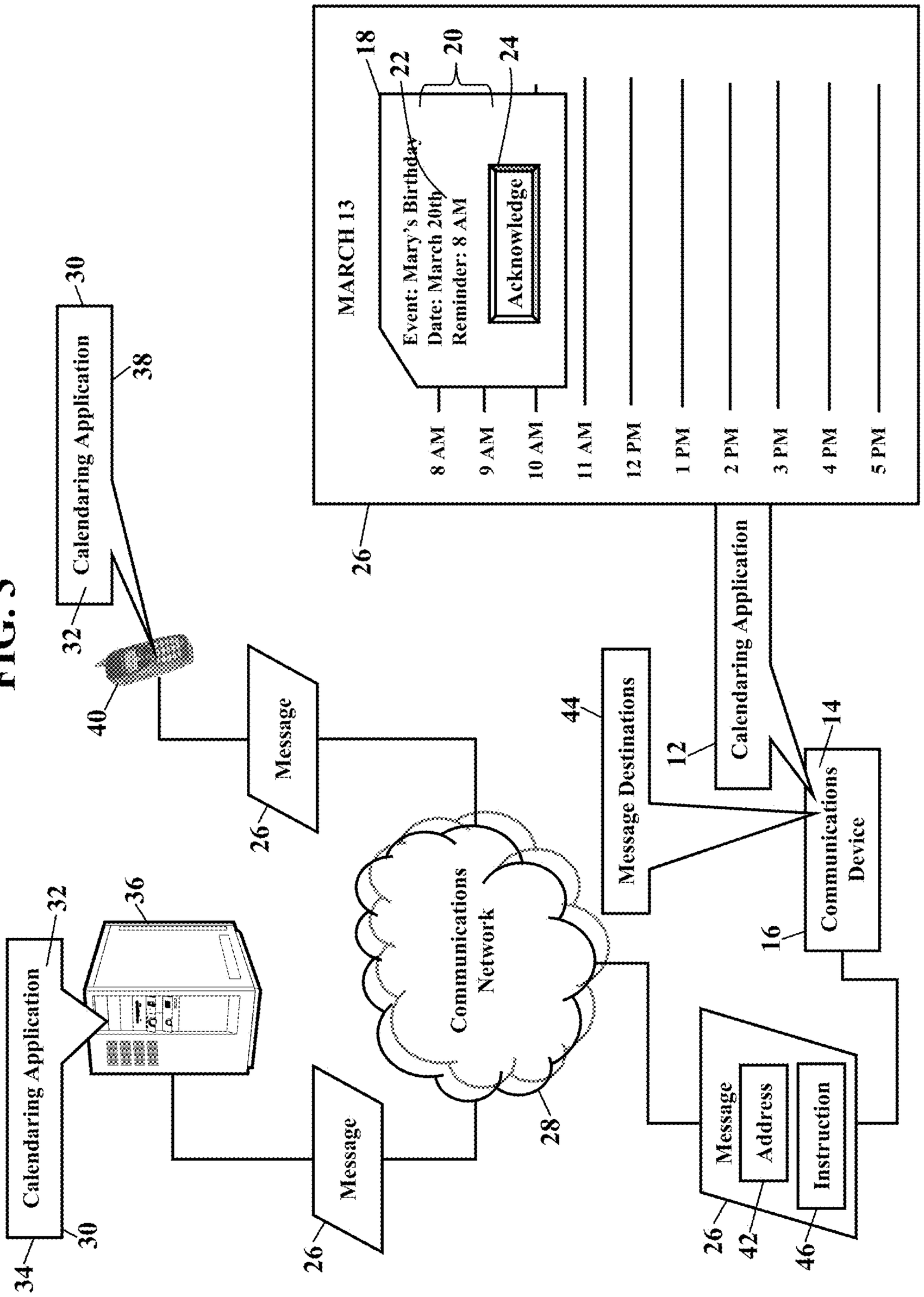

MARCH 13
18
22
20
24
Event: Mary's Birthday
Date: March 20th
Reminder: 8 AM
Acknowledge
8 AM
9 AM
10 AM
11 AM
12 PM
1 PM
2 PM
3 PM
4 PM
5 PM
26
Calendaring Application
30
32
38
40
Message
26
Message Destinations
44
12
Calendaring Application
Communications Device
14
16
Communications Network
28
Calendaring Application
32
36
Calendaring Application
34
30
Message
26
Message
26
Address
42
Instruction
46

FIG. 4

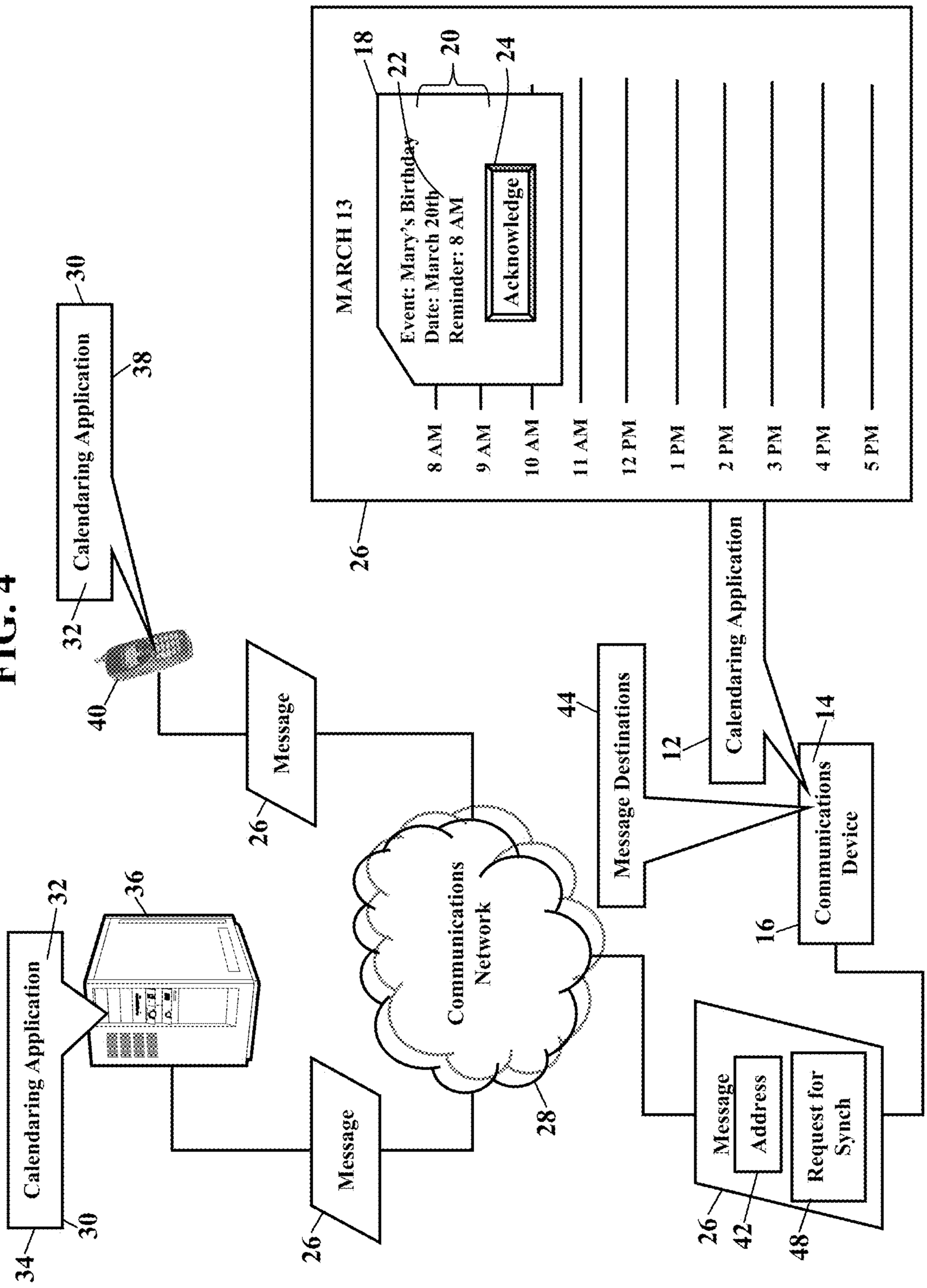

18
22
20
24
MARCH 13
Event: Mary's Birthday
Date: March 20th
Reminder: 8 AM
Acknowledge
8 AM
9 AM
10 AM
11 AM
12 PM
1 PM
2 PM
3 PM
4 PM
5 PM
26
30
Calendaring Application
32
38
40
Message
26
36
32
Calendaring Application
34
30
Message
26
Communications Network
28
44
Message Destinations
12
Calendaring Application
14
Communications Device
16
Message
26
Address
42
Request for Synch
48

FIG. 5

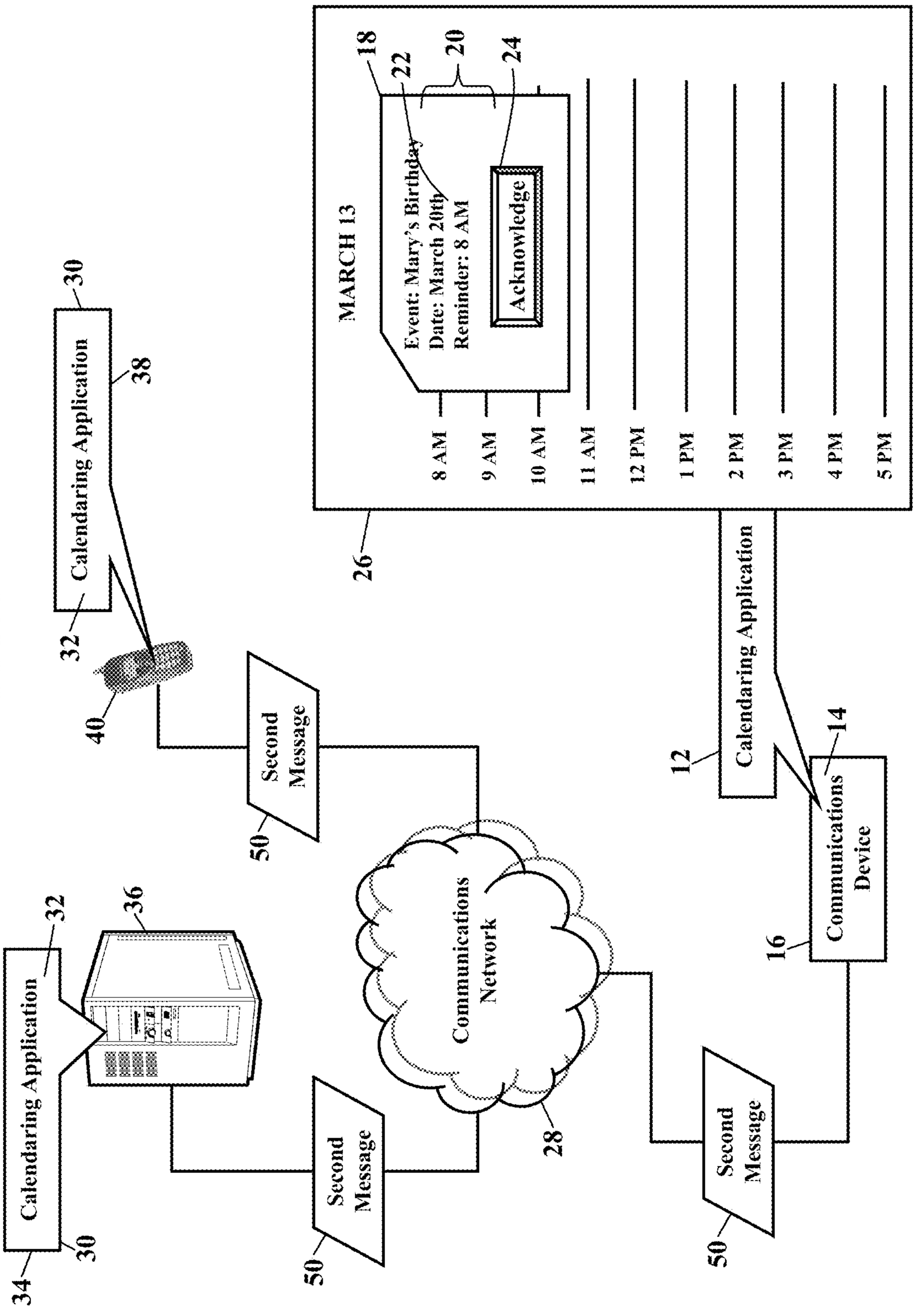

MARCH 13
Event: Mary's Birthday
Date: March 20th
Reminder: 8 AM
Acknowledge
18
22
20
24
8 AM
9 AM
10 AM
11 AM
12 PM
1 PM
2 PM
3 PM
4 PM
5 PM
26
Calendaring Application
12
Communications Device
14
16
Communications Network
28
Second Message
50
Calendaring Application
30
32
38
40
Second Message
50
Calendaring Application
32
36
34
30
Second Message
50

FIG. 6

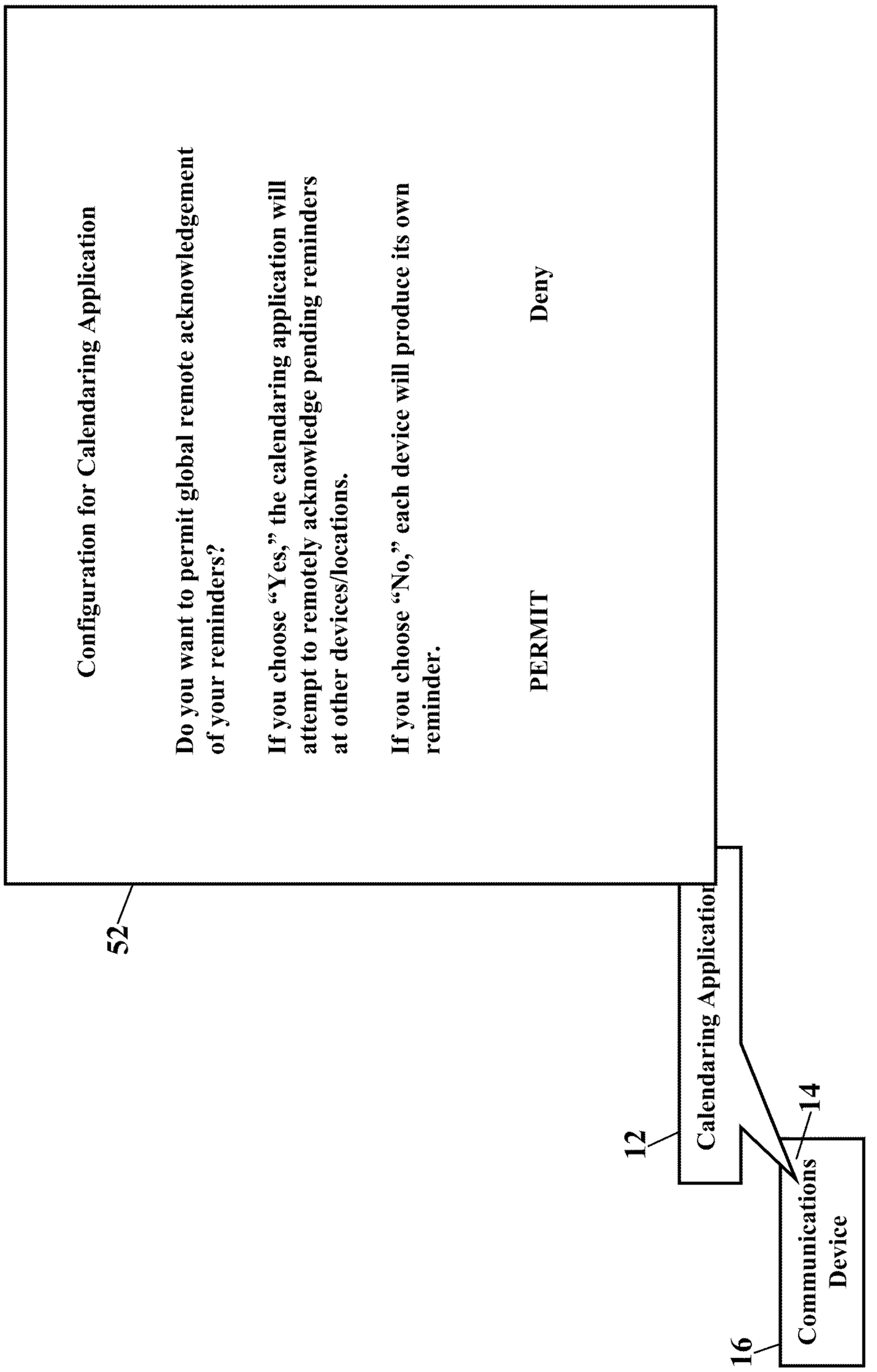

52
Configuration for Calendaring Application
Do you want to permit global remote acknowledgement of your reminders?
If you choose "Yes," the calendaring application will attempt to remotely acknowledge pending reminders at other devices/locations.
If you choose "No," each device will produce its own reminder.
PERMIT
Deny
Calendaring Application
12
Communications Device
14
16

FIG. 7

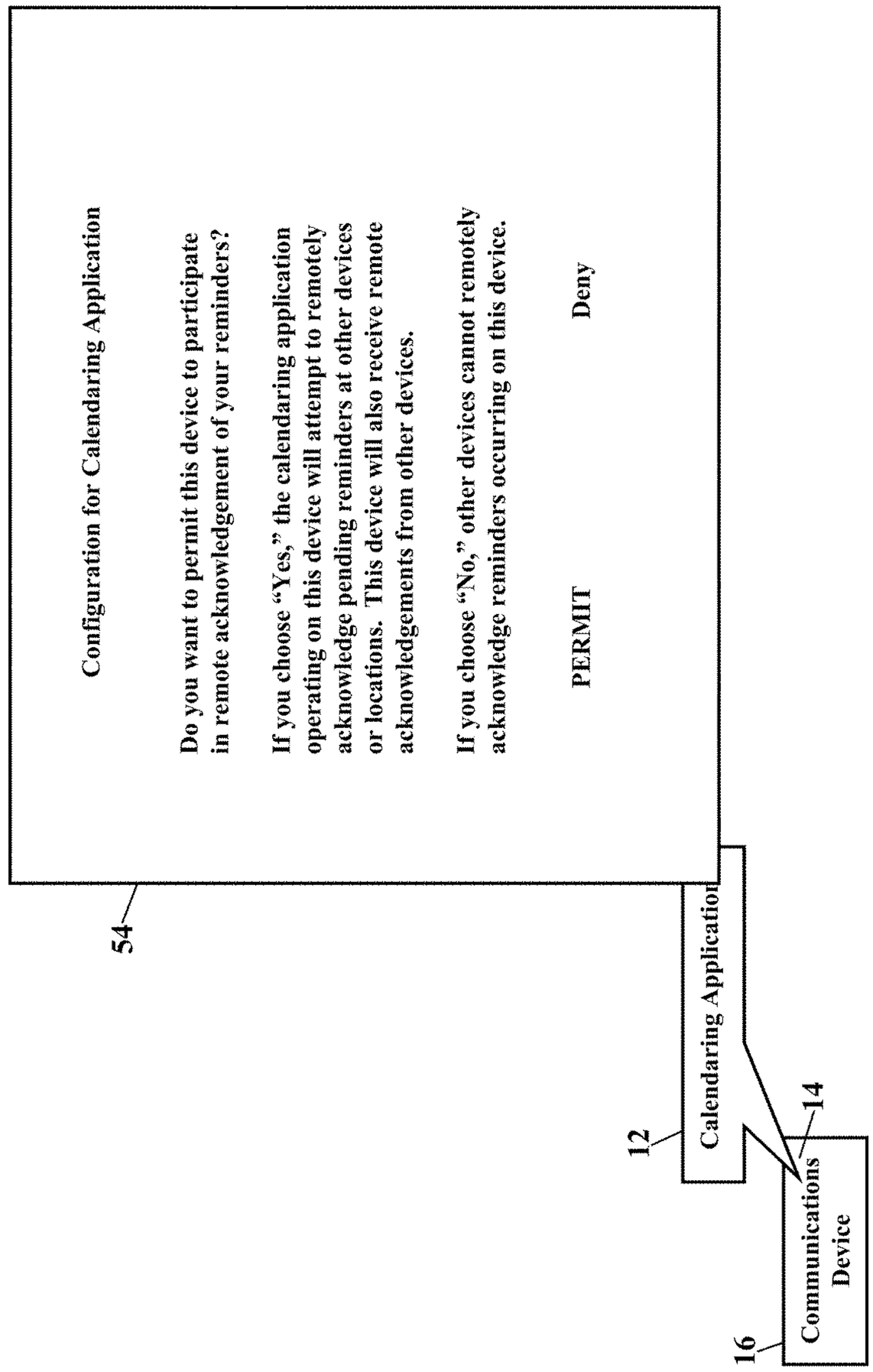

Configuration for Calendaring Application
Do you want to permit this device to participate in remote acknowledgement of your reminders?
If you choose "Yes," the calendaring application operating on this device will attempt to remotely acknowledge pending reminders at other devices or locations. This device will also receive remote acknowledgements from other devices.
If you choose "No," other devices cannot remotely acknowledge reminders occurring on this device.
PERMIT
Deny
54
daring Application
12
Calendarin
14
Communications Device
16

FIG. 8

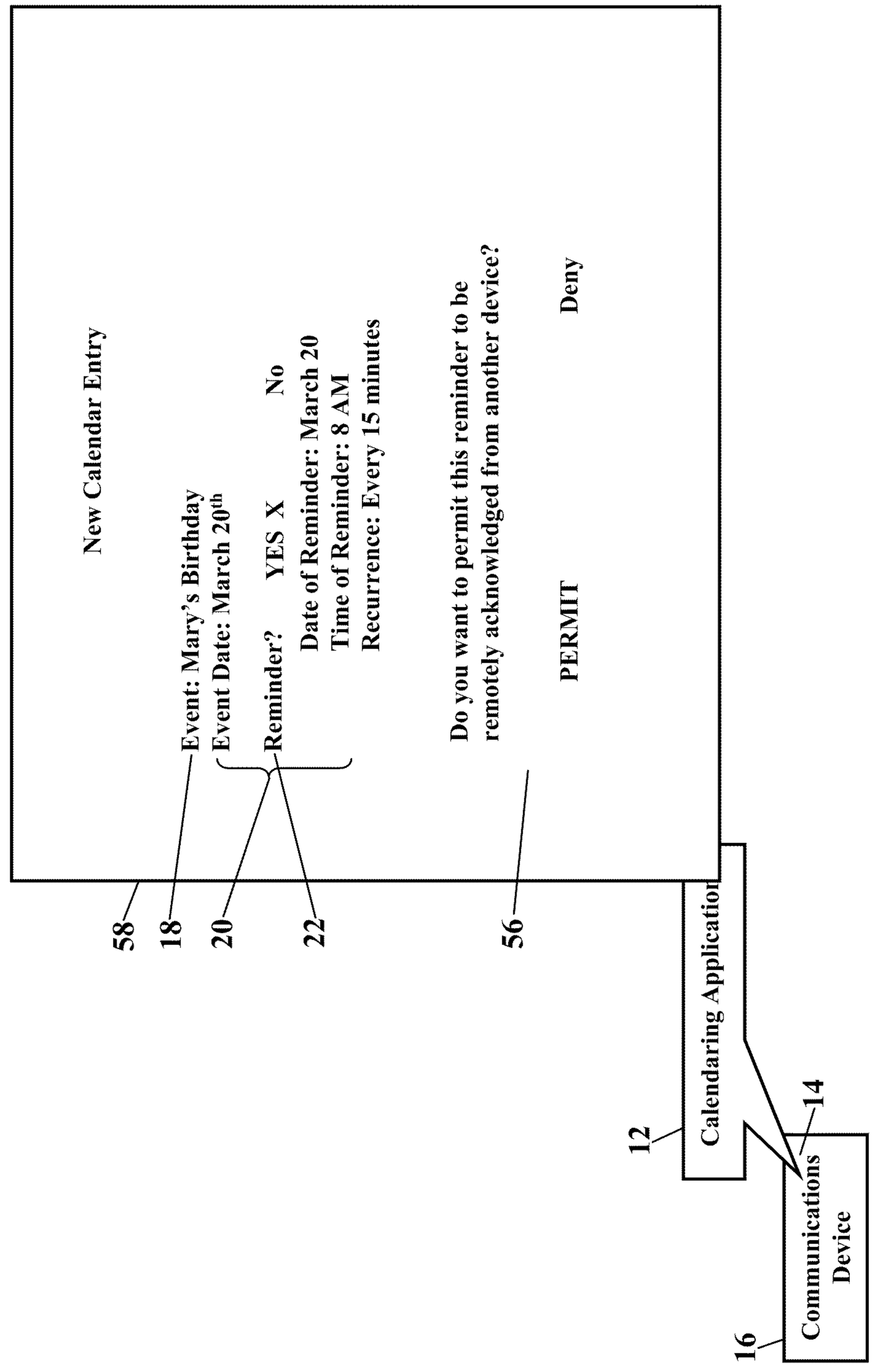

New Calendar Entry
Event: Mary's Birthday
Event Date: March 20th
Reminder? YES X No
Date of Reminder: March 20
Time of Reminder: 8 AM
Recurrence: Every 15 minutes
Do you want to permit this reminder to be remotely acknowledged from another device?
PERMIT
Deny
58
18
20
22
56
12
Calendaring Application
14
Communications Device
16

FIG. 9

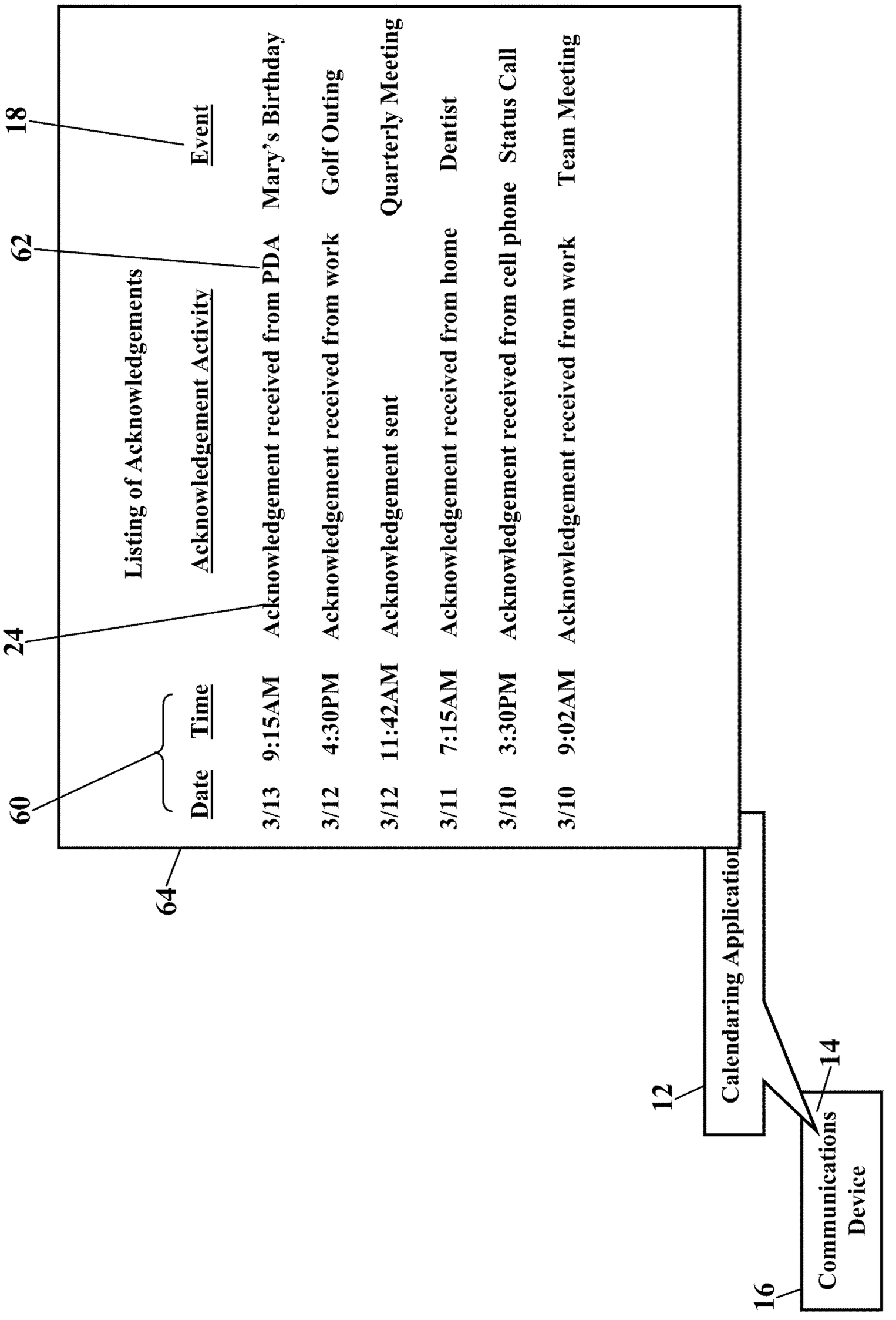

Calendaring Application
Listing of Acknowledgements
Acknowledgement Activity
Date
Time
Event
3/13 9:15AM Acknowledgement received from PDA Mary's Birthday
3/12 4:30PM Acknowledgement received from work Golf Outing
3/12 11:42AM Acknowledgement sent Quarterly Meeting
3/11 7:15AM Acknowledgement received from home Dentist
3/10 3:30PM Acknowledgement received from cell phone Status Call
3/10 9:02AM Acknowledgement received from work Team Meeting
Communications Device
12
14
16
18
24
60
62
64

FIG. 10

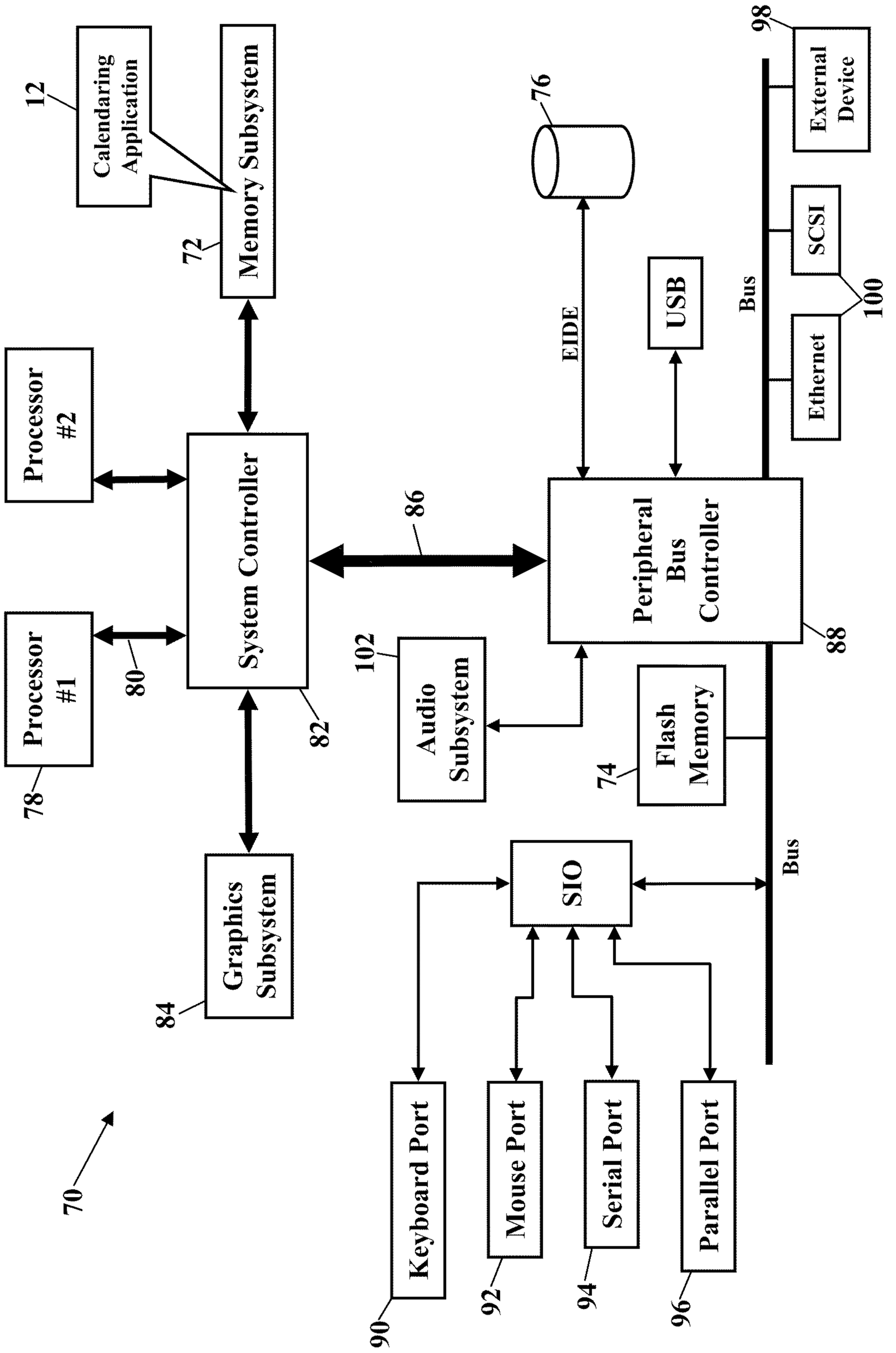

70
12
Calendaring Application
72
Memory Subsystem
76
98
External Device
SCSI
100
Ethernet
Bus
EIDE
USB
Processor #2
Processor #1
78
80
System Controller
82
86
Peripheral Bus Controller
88
102
Audio Subsystem
74
Flash Memory
Graphics Subsystem
84
SIO
Bus
Keyboard Port
90
Mouse Port
92
Serial Port
94
Parallel Port
96

FIG. 11

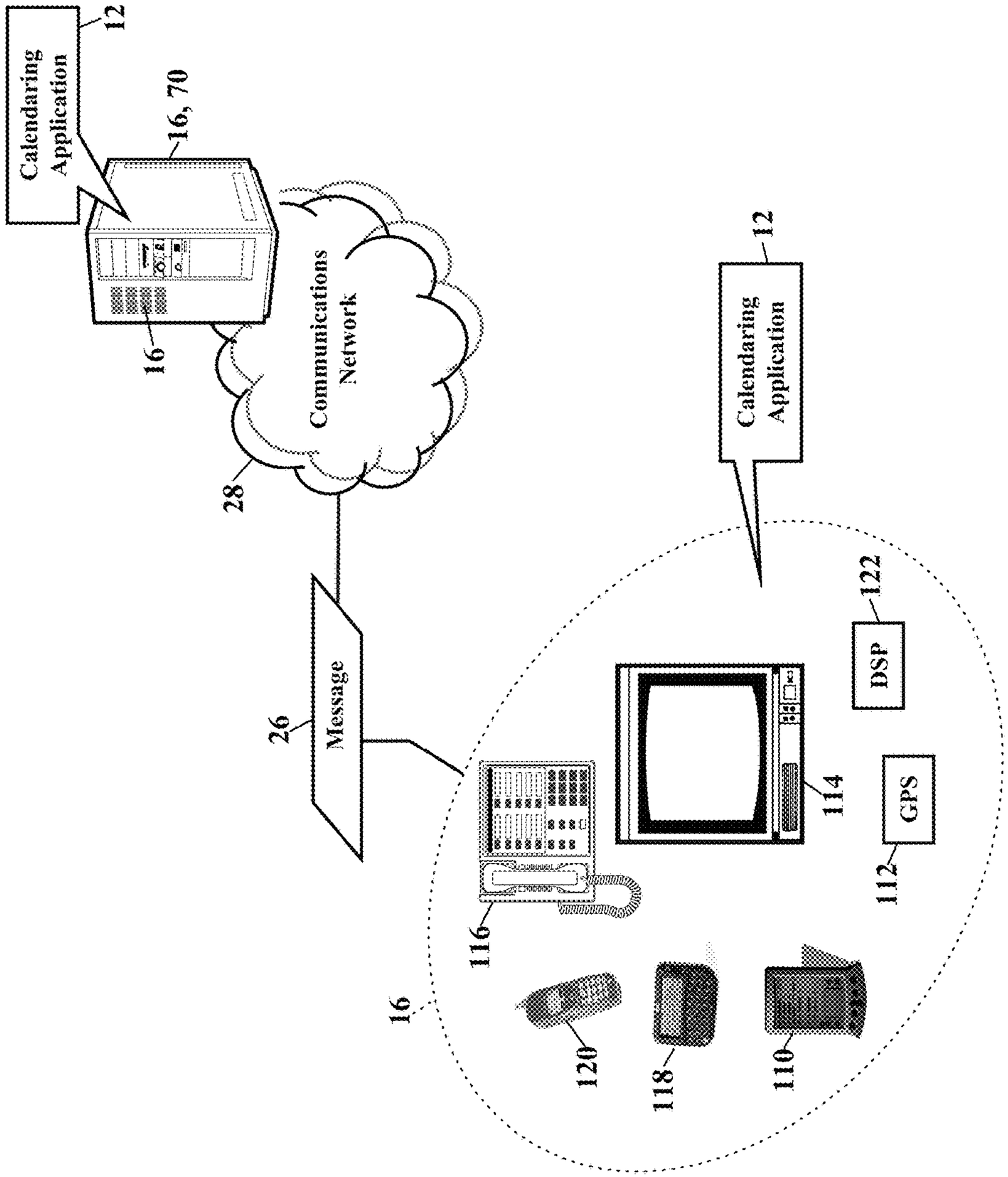
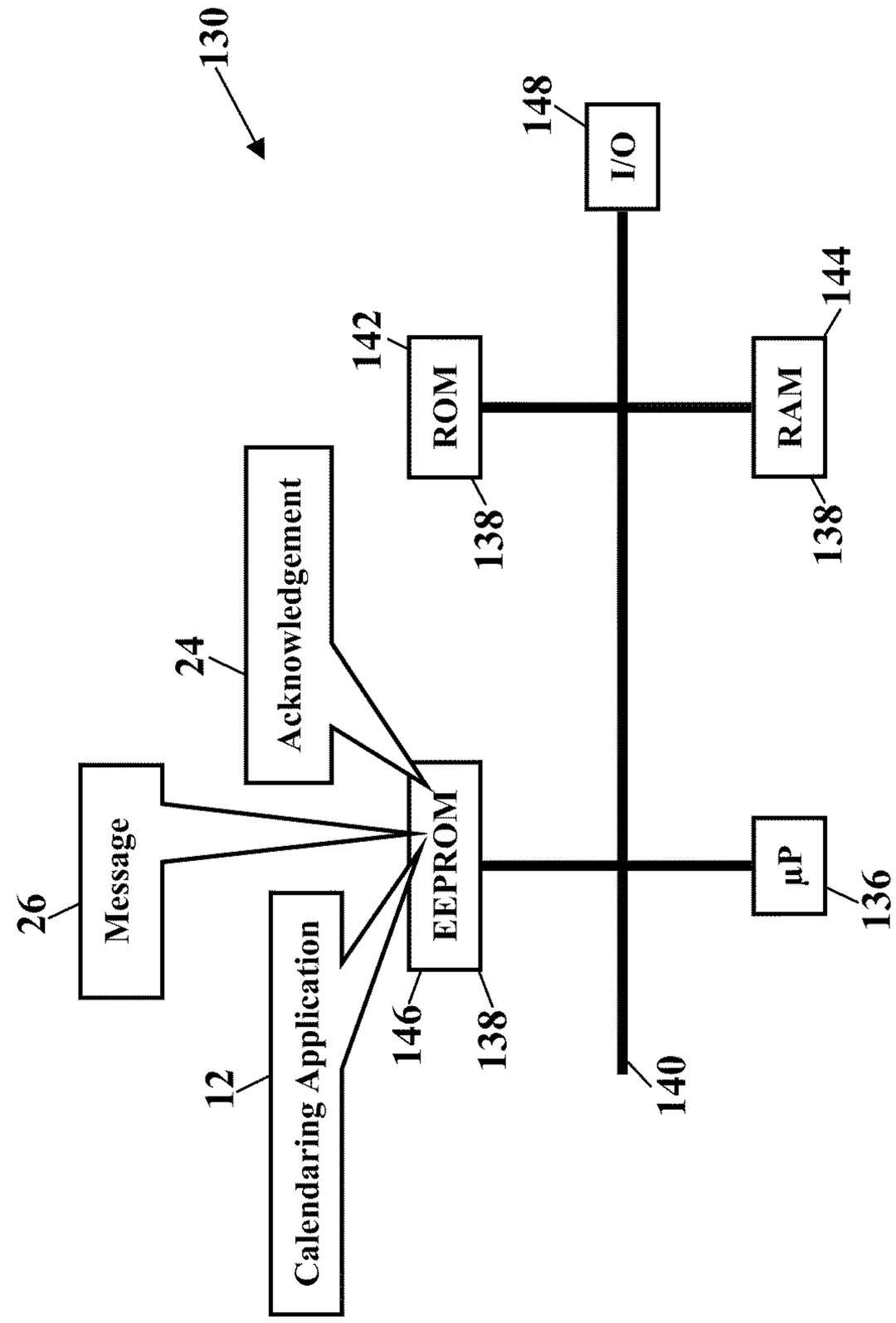

Calendaring Application
12
16, 70
16
Communications Network
28
26
Message
Calendaring Application
12
DSP
122
GPS
112
114
116
16
120
118
110

FIG. 12


130
12
Calendaring Application
26
Message
24
Acknowledgement
146
EEPROM
138
140
142
ROM
138
148
I/O
144
RAM
138
µP
136

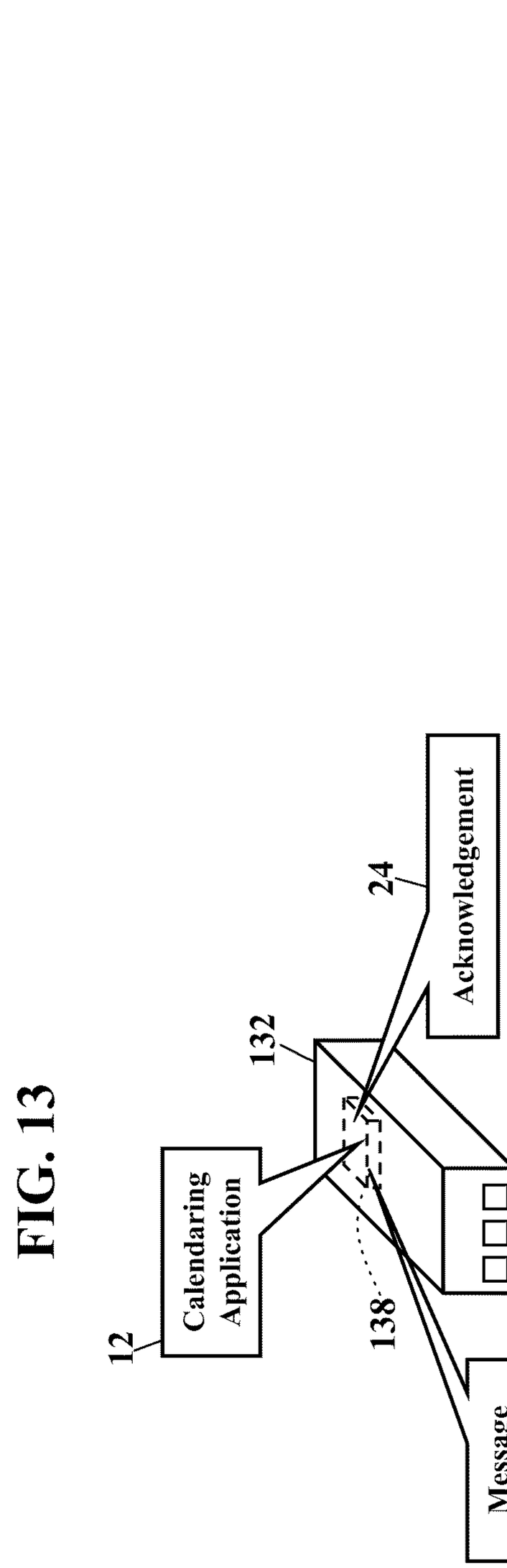

132
24
Acknowledgement
12
Calendaring Application
138
Message
26

FIG. 13

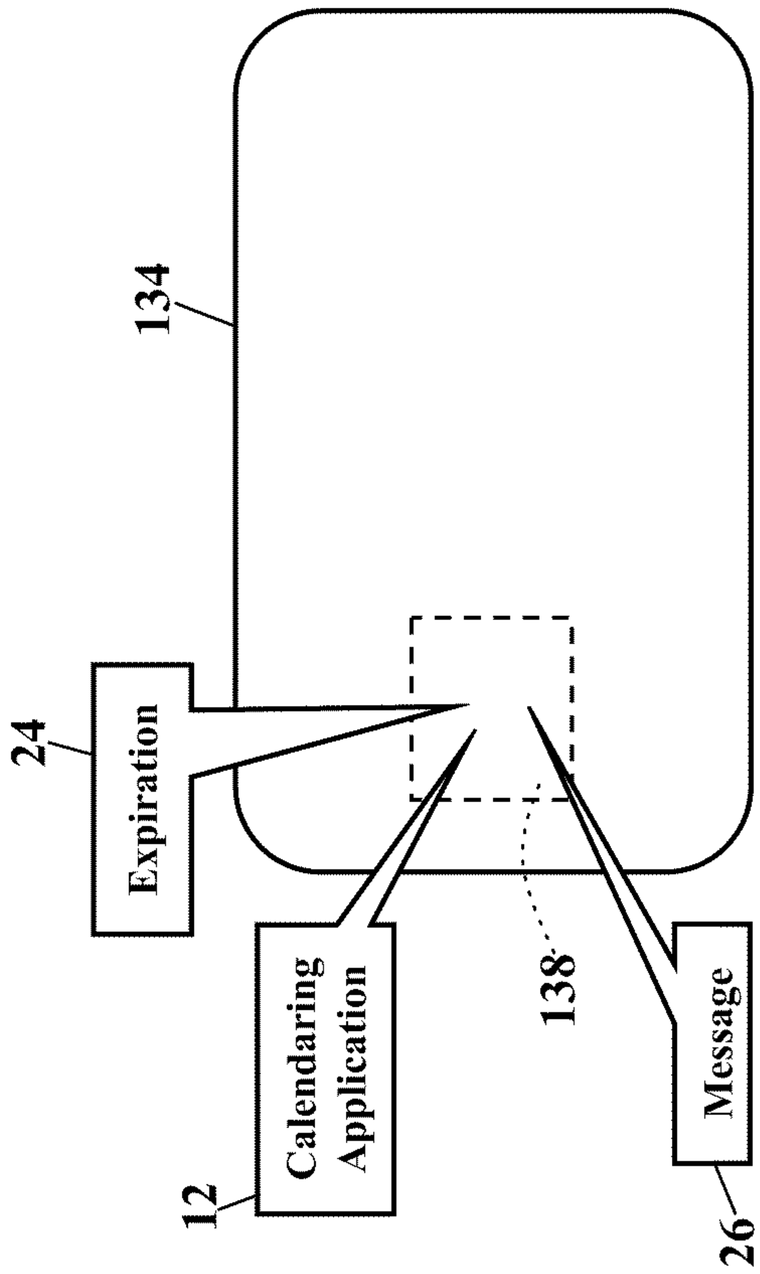

134
24
Expiration
12
Calendaring Application
138
Message
26

FIG. 14

FIG. 15

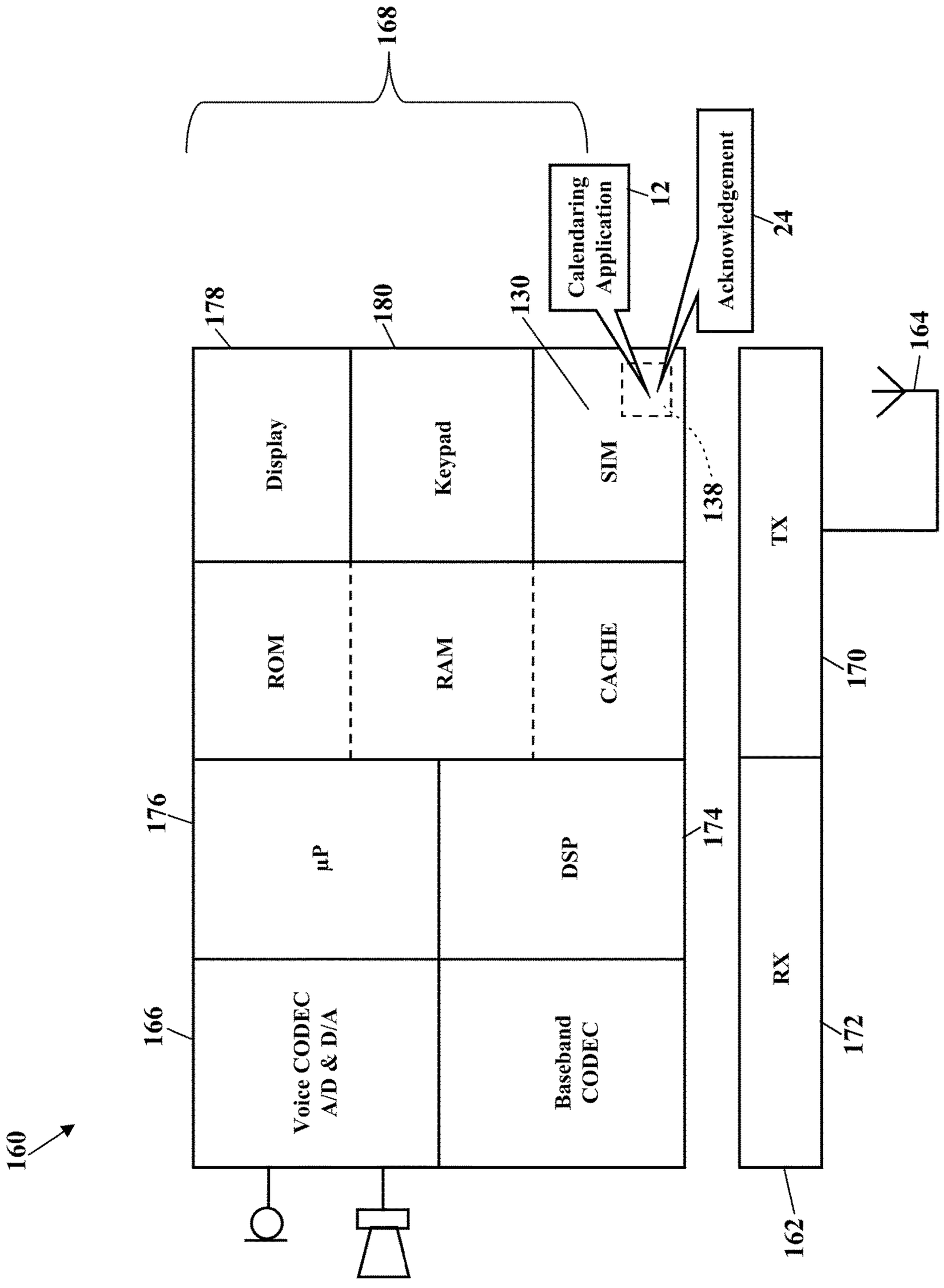
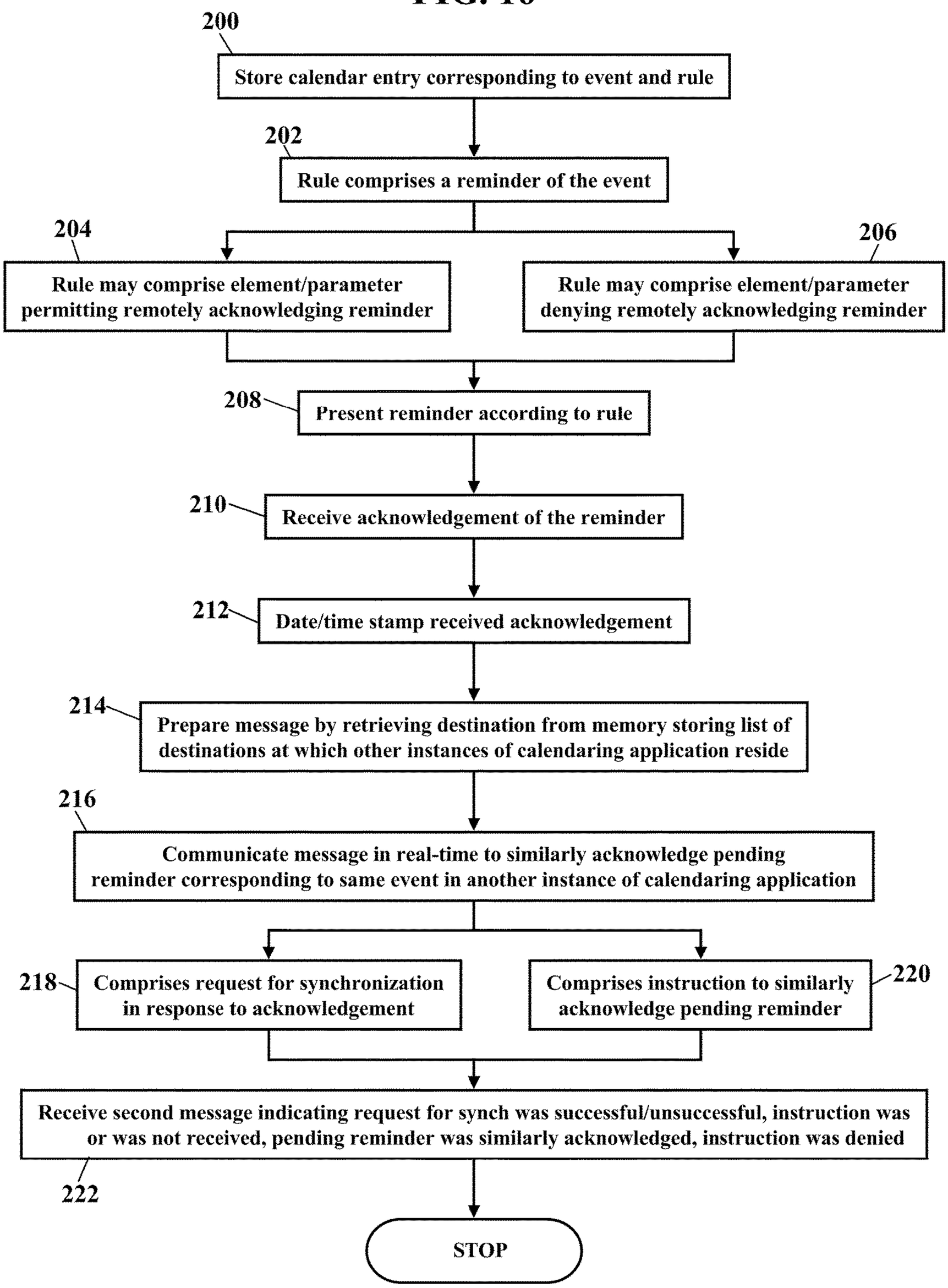

168
Calendaring Application
12
Acknowledgement
24
178
180
130
Display
Keypad
SIM
138
164
ROM
RAM
CACHE
TX
170
176
µP
DSP
174
166
Voice CODEC A/D & D/A
Baseband CODEC
RX
172
160
162

FIG. 16


200
Store calendar entry corresponding to event and rule
202
Rule comprises a reminder of the event
204
Rule may comprise element/parameter permitting remotely acknowledging reminder
206
Rule may comprise element/parameter denying remotely acknowledging reminder
208
Present reminder according to rule
210
Receive acknowledgement of the reminder
212
Date/time stamp received acknowledgement
214
Prepare message by retrieving destination from memory storing list of destinations at which other instances of calendaring application reside
216
Communicate message in real-time to similarly acknowledge pending reminder corresponding to same event in another instance of calendaring application
218
Comprises request for synchronization in response to acknowledgement
220
Comprises instruction to similarly acknowledge pending reminder
222
Receive second message indicating request for synch was successful/unsuccessful, instruction was or was not received, pending reminder was similarly acknowledged, instruction was denied
STOP

METHODS, SYSTEMS AND PRODUCTS FOR SYNCHRONIZING REMINDER ACKNOWLEDGEMENTS IN CALENDARING APPLICATIONS

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. patent application Ser. No. 11/095,391 filed Mar. 31, 2005 and now issued as U.S. Pat. No. 7,925,990, and incorporated herein by reference. This application also relates to U.S. patent application Ser. No. 12/617,743 filed Nov. 13, 2009, which is a continuation of U.S. application Ser. No. 11/068,418 filed Feb. 28, 2005 and now issued as U.S. Pat. No. 7,640,507, with both applications incorporated herein by reference in their entireties.

NOTICE OF COPYRIGHT PROTECTION

BACKGROUND

This application generally relates to electrical communications and to data processing and, more particularly, to scheduling, to task assignment, and to reminders in electronic calendaring applications.

Electronic calendaring applications utilize reminders. These calendaring applications allow users to create calendar entries and to associate the entries with dates and times. These calendaring applications also allow users to establish reminders of the calendared events. The user may even specify at what date and time the reminder is presented prior to the event.

These prior art reminders, however, have a common irritation. When the user synchronizes their calendar between different devices, the user can receive multiple reminders for a single entry. The user thus scrambles to silence the reminder produced by each device. It's not uncommon to have a PC, a PDA, a cell phone, and a pager all synchronized to remind the user of a calendar event. At similar times, then, all these devices may "ding," vibrate, or otherwise alert the user of the calendar event. The user must locate each device and acknowledge the reminder. What is needed, however, is the ability to acknowledge all the reminders from a single device.

SUMMARY

The aforementioned problems, and other problems, are reduced, according to the exemplary embodiments, using methods, systems, and products that acknowledge a reminder between multiple devices. The exemplary embodiments describe a calendaring application that the user maintains on one or more devices. That is, the user may maintain their calendar on multiple communications devices, such as a PC, a PDA, a cell phone, and/or a pager. The exemplary embodiments are also applicable to different devices operating different calendaring applications, but the different calendaring applications share entries, reminders, and other data, through the use of common or standardized data formats. When any of these devices "dings" or vibrates to alert the user of a calendared event, the user can acknowledge that reminder from a single device. That acknowledgement is then communicated effectively in real-time to all the other devices. The acknowledgement is communicated so that the user will not experience a perceptible delay in operation, although the actual background transaction may be taking place on a delayed basis. Even if all the devices are dinging/vibrating, the user need only locate one device and acknowledge the reminder. The exemplary embodiments will then communicate that acknowledgement to all the other devices, thus silencing all the reminders from a single device.

According to exemplary embodiments, the user can completely configure the acknowledgement. The user, for example, may globally configure the calendaring application to permit, or to deny, remote acknowledgement. The term "remote acknowledgement" and its variants mean reminders can be remotely acknowledged from other devices/locations. The exemplary embodiments first allow the user to specify whether remote acknowledgement is desired for all instances of the calendaring application. The user may also configure each device that stores the calendaring application for remote acknowledgement. That is, the user determines which devices can be remotely acknowledged. If a device participates in remote acknowledgement, that device can send/receive acknowledgements to/from other devices or applications. The user can also configure each calendar entry for remote acknowledgement. Each reminder may be individually configured to permit, or to deny, remote acknowledgement. The user may have calendar entries that should not be remotely acknowledged, but the user doesn't mind if other calendar entries are remotely acknowledged from other devices. The exemplary embodiments may even include a configurable arbitration mechanism. Because the user maintains several instances of their calendar on multiple devices, perhaps operating multiple applications, it is possible that the different instances may conflict. The exemplary embodiments, then, may need some mechanism that arbitrates between conflicting instances, as will be explained.

The exemplary embodiments include methods, systems, and products for acknowledging a reminder in an electronic calendar. One such exemplary embodiment stores a calendar entry corresponding to an event and a rule. The rule comprises a reminder of the event. When the electronic calendar presents the reminder, according to the rule, an acknowledgement is received. A message is then communicated effectively in real-time to similarly acknowledge a pending reminder that corresponds to the same event in another instance of the calendaring application.

In another of the embodiments, a system acknowledges a reminder in an electronic calendar. A calendaring application is stored in memory, and a processor communicates with the memory. The processor stores a calendar entry corresponding to an event and a rule, with the rule comprising the reminder of the event. The processor presents the reminder according to the rule and the processor receives an acknowledgement of the reminder. The processor communicates effectively in real-time a message to similarly acknowledge a pending reminder that corresponds to the same event in another instance of the calendaring application. If the calendaring application utilizes a "poll" solution, as will be later explained, the calendaring application may poll a central device or server. The calendaring application would poll to make sure, before activating a reminder, that that reminder has not already been acknowledged by another device or application.

In yet another embodiment, a computer program product acknowledges a reminder in an electronic calendar. The computer program product comprises a computer-readable medium and a calendaring application stored on the computer-readable medium. The calendaring application comprises computer code for storing a calendar entry corresponding to an event and a rule. The rule comprises a reminder of the event. The reminder is presented according to the rule and an acknowledgement is received. A message is communicated effectively in real-time to similarly acknowledge a pending reminder that corresponds to the same event in another instance of the calendaring application.

Other systems, methods, and/or computer program products according to the exemplary embodiments will be or become apparent to one with ordinary skill in the art upon review of the following drawings and detailed description. It is intended that all such additional systems, methods, and/or computer program products be included within this description, be within the scope of the claims, and be protected by the accompanying claims.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

These and other features, aspects, and advantages of the exemplary embodiments are better understood when the following Detailed Description is read with reference to the accompanying drawings, wherein:

FIGS. **1** and **2** are schematics illustrating an electronic calendar produced by a calendaring application, according to the exemplary embodiments;

FIGS. **3** and **4** are schematics illustrating some possible details of a message that is communicated between devices, according to the exemplary embodiments;

FIG. **5** is a schematic illustrating a second, return message, according to even more exemplary embodiments;

FIGS. **6-8** are schematics illustrating schemes for remote acknowledgement, according to more exemplary embodiments;

FIG. **9** is a schematic illustrating an arbitration mechanism according to yet more exemplary embodiments;

FIG. **10** illustrates an operating environment for the exemplary embodiments;

FIG. **11** is a schematic illustrating still more exemplary embodiments operating within various communications devices;

FIGS. **12-14** are schematics further illustrating various communications devices for processing the expiration, according to the exemplary embodiments;

FIG. **15** is a schematic further illustrating various communications devices for processing the expiration, according to the exemplary embodiments; and

FIG. **16** is a flowchart illustrating a method of acknowledging a reminder in an electronic calendar.

DETAILED DESCRIPTION

The exemplary embodiments will now be described more fully hereinafter with reference to the accompanying drawings. The exemplary embodiments may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein. These embodiments are provided so that this disclosure will be thorough and complete and will fully convey the scope of the invention to those of ordinary skill in the art. Moreover, all statements herein reciting embodiments, as well as specific examples thereof, are intended to encompass both structural and functional equivalents thereof. Additionally, it is intended that such equivalents include both currently known equivalents as well as equivalents developed in the future (i.e., any elements developed that perform the same function, regardless of structure).

Thus, for example, it will be appreciated by those of ordinary skill in the art that the diagrams, schematics, illustrations, and the like represent conceptual views or processes illustrating the exemplary embodiments. The functions of the various elements shown in the figures may be provided through the use of dedicated hardware as well as hardware capable of executing associated software. Similarly, any switches shown in the figures are conceptual only. Their function may be carried out through the operation of program logic, through dedicated logic, through the interaction of program control and dedicated logic, or even manually, the particular technique being selectable by the entity implementing this invention. Those of ordinary skill in the art further understand that the exemplary hardware, software, processes, methods, and/or operating systems described herein are for illustrative purposes and, thus, are not intended to be limited to any particular named manufacturer.

The exemplary embodiments describe a calendaring application. This calendaring application allows remote acknowledge of a reminder between multiple devices. When a user maintains their calendar on multiple communications devices, the exemplary embodiments allow the user to acknowledge a reminder from a single device. That acknowledgement is then communicated effectively in real-time to all the other devices. Even if all the devices are dinging/vibrating, the user need only locate one device and acknowledge the reminder. The exemplary embodiments will then communicate that acknowledgement to all the other devices, thus silencing all the reminders from a single device.

FIGS. **1** and **2** are schematics illustrating an electronic calendar **10** according to an exemplary embodiment. The electronic calendar **10** is produced by a calendaring application **12** stored in memory **14** of a communications device **16**. Although the communications device **16** is generically shown, the communications device **16**, as will be later explained, may be a computer, a personal digital assistant (PDA), a cordless/cellular/IP phone, or other wireline/wireless communications device. The calendaring application **12** stores or records an event **18**, such as an appointment, a meeting, a holiday, a birthday, other occasion, important dates, deadlines, and/or anniversaries. The event **18** includes a rule **20**. The rule **20** may comprise a date and/or a time at which the event is to occur. The calendaring application **12** stores a calendar entry corresponding to the event **18**. As FIG. **1** shows, for example, the event **18** is "Mary's Birthday," and the rule **20** specifies an event date of March 20th. The rule **20** may also comprise a reminder **22**. The reminder **22** may include a date and a time at which a notification or an alert is audibly and/or visually presented by the calendar application **12**. The reminder **22** provides notice associated with the stored event **18**. The alert, for example, may be an audible sound, alarm, and/or visual notification that reminds a user of the upcoming event **18**.

FIG. **2** illustrates the reminder **22**. The rule **20** specifies an event date of March 20th, and the reminder **22** is to be presented one week prior to Mary's birthday. FIG. **2**, then, illustrates a visual presentation of the reminder **22** on March 13th, one week prior to Mary's birthday. The reminder **22** includes an opportunity for a user to acknowledge **24** the

reminder **22**. FIG. **2** shows the acknowledgement **24** as a graphical button that the user "clicks" with a pointing device or "taps" on a screen. The acknowledgement **24**, however, can be any action, input, occurrence, or event that is recognized by the calendaring application **12**. The acknowledgement **24** may include any actions that dismisses/cancels the reminder **22**, delays the reminder **22**, suspends the reminder **22**, and/or other actions that will be explained. The acknowledgement **24** informs the calendaring application **12** that the reminder **22** was viewed, heard, smelled, felt, even tasted by the user. The acknowledgement **24** may be a keystroke on a keyboard, the push of a button on a pointing device, an input to a pressure-sensitive display, or any other input recognized by the calendaring application **12**. The calendaring application **12**, in fact, may not require an input, but, instead, self-acknowledge using software-defined conditions. However the reminder **22** is acknowledged, that acknowledgement **24** is received by the calendaring application **12**.

FIG. **2** also illustrates a message **26**. When the user acknowledges the reminder **22**, the calendaring application then communicates the message **26** via a communications network **28**. The message **26** is sent to other instances **30** of the calendaring application **12**. The message **26** causes the other instances **30** of the calendaring application **12** to similarly acknowledge a pending reminder **32** that corresponds to the same event **18** in the other instances **30**. These other instances **30** are similar representations of the calendaring application **12** that are stored/maintained on other devices and/or at other locations. The user, for example, may maintain a second instance **34** of the calendaring application **12** on a home computer **36** and a third instance **38** on a wireless phone **40**. The message **26** communicates via the communications network **28** to the other instances **34** and **38** to immediately synchronize all representations of the calendaring application **12**. The message **26** thus keeps all the instances **30** of the calendaring application **12** up-to-date with the acknowledgement **24**. However the user acknowledges the reminder **22** (whether dismissal, cancellation, delay, suspension, saying a word or phrase, nodding to a camera, and/or other action), the message **26** causes the home computer **36** and the wireless phone **40** to similarly acknowledge the pending reminder **32** corresponding to the same event **18**. The message **26** thus prevents both the home computer **36** and the wireless phone **40** from redundantly reminding the user of the same event **18**.

The message **26** is sent effectively in real-time upon receipt of the acknowledgement **24**. When the user acknowledges the reminder **22**, the calendaring application then communicates the message **26** via a communications network **28**. The message **26** is sent to all the other instances **30** of the calendaring application **12**. Because the message **26** is sent with each acknowledgement **24**, the message **26** is a synchronizing communication to all the instances **30** of the calendaring application **12**. The message **26** causes all the instances **30** of the calendaring application **12** to intelligently mirror one another. All the user's instances of the calendaring application **12**, regardless of device location, can be immediately updated with each acknowledgement.

The exemplary embodiments are also applicable to a "pull" solution. The above paragraphs describe a "push" solution, in which the calendaring application **12** pushes updates to other devices. The "pull" solution allows each individual device to periodically re-sync data to keep it current. Each instance **30** of the calendaring application **12** that is stored/maintained on another device, and/or at another location, would periodically poll the other instances for updates. If updates are available, each instance **30** would initiate a communication to "pull" those updates into memory. This "pull" or "poll" solution is especially applicable for devices or networks with intermittent access. Whether the exemplary embodiments utilize the "push" or "pull" solution, the calendar devices may all be synced to a central server, either effectively in real-time or sync mode.

The exemplary embodiments are also applicable to self-organizing devices. Some of the above paragraphs generally describe a controlling device that notifies other devices. Some of the other above paragraphs describe multiple devices that synchronize to a central server. The exemplary embodiments, however, are also applicable to other topologies. The exemplary embodiments, for example, may be applied to a network of equals. This network of equals describes data on any one device that is routinely synchronized with other devices, without a specified hierarchy. This network of equals is exemplified by the technology known as "smart dust"—that is, devices that self-organize.

The calendaring application **12**, the reminder **22** and the message **26** are each customizable. As the following paragraphs will explain, the calendaring application **12** may be configured to include any or all of the features described herein. The calendaring application **12**, for example, may be configured to permit, or to not permit, remote acknowledgement of the reminder **22**. That is, should a reminder in one instance of the calendaring application **12** be acknowledged, the user determines whether similar reminders for similar events in other remote instances are similarly acknowledged. The message **26**, too, can be configured according a message topography, network type(s) and conditions, protocols, and arbitration procedures. Those of ordinary skill in the art will also appreciate that there are many suitable implementations for the calendaring application **12** described herein. MICROSOFT®, for example, offers OUTLOOK® and OUTLOOK EXPRESS®, both of which provide electronic calendars (MICROSOFT®, OUTLOOK®, and OUTLOOK EXPRESS® are registered trademarks of Microsoft Corporation, One Microsoft Way, Redmond Wash. 98052-6399, 425.882.8080, www.Microsoft.com). Other vendors also offer other calendaring software applications, and the concepts described herein may be applied to any calendaring application by any vendor.

The calendaring application **12**, the reminder **22** and the message **26** may be applied regardless of networking environment. The communications network **28** may be a cable network operating in the radio-frequency domain and/or the Internet Protocol (IP) domain. The communications network **28**, however, may also include a distributed computing network, such as the Internet (sometimes alternatively known as the "World Wide Web"), an intranet, a local-area network (LAN), and/or a wide-area network (WAN). The communications network **28** may include coaxial cables, copper wires, fiber optic lines, and/or hybrid-coaxial lines. The communications network **28** may even include wireless portions utilizing any portion of the electromagnetic spectrum and any signaling standard (such as the I.E.E.E. 802 family of standards, GSM/CDMA/TDMA or any cellular standard, and/or the ISM band). The concepts described herein may be applied to any wireless/wireline communications network, regardless of physical componentry, physical configuration, or communications standard(s).

FIG. **3** is a schematic illustrating some possible details of the message **26**. The message **26**, for example, may comprise an address portion **42**. Before the message **26** is communicated, the calendaring application **12** may first need to know where each message **26** is to be sent. The calendaring application **12** may first retrieve one or more

message destinations **44** from memory. Any local and/or remote memory location may store a list of destinations to which the message **26** is sent. Although the message destinations **44** may have any message topography, each destination preferably describes where each other instance **30** of the calendaring application **12** resides. FIG. **3**, for simplicity, shows the message destinations **44** retrieved from the memory **14**. The message **26**, then, would include the address portion **42** containing the message destination **44** retrieved from memory **14**.

The message **26** may also comprise an instruction **46**. This instruction **46** could include information or coding that causes the other instances **30** of the calendaring application **12** to similarly acknowledge the pending reminder **32** for the same event. These other instances **30** are similar representations of the calendaring application **12** that are stored/maintained on other devices and/or at other locations. The message **26**, for example, could communicate to the second instance **34** of the calendaring application **12** stored on the home computer **36**. The message **26** could also communicate to the third instance **38** stored on the wireless phone **40**. The message **26** instructs these other instances **34**, **38** to immediately acknowledge the pending reminder **32** for the corresponding event. The message **26** thus keeps all the instances **30** of the calendaring application **12** up-to-date with the acknowledgement **24**.

FIG. **4** is a schematic illustrating additional or alternative details of the message **26**. The message **26**, as before, may comprise the address portion **42**. Here, however, the message **26** comprises a request **48** for synchronization (shown as "Request for Synch" for simplicity). The request **48** for synchronization could include information or coding that requests, initiates, or causes a wireless/wired synchronization process between communications devices. This synchronization process causes different instances of the calendaring application **12** to synchronize events, rules, and acknowledgements. The synchronization process would cause the other instances **30** of the calendaring application **12** to similarly acknowledge the pending reminder **32** for the same event. The message **26**, for example, would cause the calendaring application **12** operating in the communications device **16** to synchronize with the second instance **34** of the calendaring application **12** stored on the home computer **36**. The message **26**, likewise, would cause the communications device **16** and the wireless phone **40** to synchronize. If the separate devices are capable of wireless communication, this synchronization could occur without user intervention. A wired synchronization would, of course, require a physical link. Here, then, each acknowledgement **24** would produce a corresponding request for synchronization.

The message **26** could also comprise other details or elements. The message **26**, for example, could include a status bit (or bits) that indicate a status of the reminder **22**. Whenever the user acknowledges the reminder **22**, the message **26** could include a bit or bits that reflect the acknowledgement **24**. The message **26** could also comprise a flag or other indicator that informs other instances of the acknowledgement. The message **26**, in short, may have any element that indicates the acknowledgement **24** is being communicated to other instances of the calendaring application **12**.

FIG. **5** is a schematic illustrating a second, return message **50**. This incoming second message **50** provides a status of the outgoing message (shown as reference numeral **26** in FIGS. **3** and **4**). The second, incoming message **50** is used when the user configures the calendaring application **12** for "registered" communications, thus knowing receipt and processing occurred. The calendaring application **12** may even require registered communications between the various instances **30**. The incoming second message **50** may indicate that a communication attempt was successful, failed, timed-out, or was rejected by the destination. The second message **50**, for example, may confirm receipt of the outgoing message **26** by the destination. The second message **50** may additionally or alternatively indicate that the outgoing message **26** was not received at the destination. The second message **50** may additionally or alternatively indicate that the pending reminder was similarly acknowledged at the destination. The second message **50** may additionally or alternatively indicate the destination denied or rejected the instruction **46** or the request **48** for synchronization. The second message **50** may additionally or alternatively indicate that the request **48** for synchronization was successful or unsuccessful (e.g., failed). While this return message **50** may not typically be presented to the user, it will be useful to keep track of the status of a sync request, initiate a re-transmission of an unacknowledged request, keep track of the type of request (push or pull), also destinations, and time sent or received. This will be useful in troubleshooting message sync problems, and could be made available to certain technically advanced users or others with a need to know this sort of information.

FIGS. **6-8** are schematics illustrating schemes for remote acknowledgement, according to more exemplary embodiments. The term "remote acknowledgement" means an instance of the calendaring application **12** will process the message **26** received from other instances. Recall the message **26** is sent to other instances **30** of the calendaring application **12**, and the message **26** causes the other instances **30** to similarly acknowledge a pending reminder. FIGS. **6-8** illustrate how the user may configure the calendaring application **12** to permit, or to deny, remotely acknowledging the reminder **22**. If, however, the user makes no explicit selection, the calendaring application **12** may include an optional "default" setting. This default setting is implemented when the user fails to make a selection.

FIG. **6** illustrates global remote acknowledgement. FIG. **6** shows that the calendaring application **12** may be globally configured to permit, or to deny, remote acknowledgement. The calendaring application **12** has a global configuration option **52**. This global configuration option **52** allows the user to select whether remote acknowledgement is permissible. If the user selects "PERMIT," the calendaring application **12** will enable features that initiate the message **26** with each acknowledgement of a reminder. If the user selects "Deny," the calendaring application **12** will disable the message **26**. The global configuration option **52**, then, allows the user to first determine whether remote acknowledgement is desired for all instances of the calendaring application **12**. If a central server hosts the calendar application **12** and/or data, the central server can make this global configuration option available to the individual calendaring devices.

FIG. **7** illustrates a device-level configuration option **54**. FIG. **7** shows that each instance of the calendaring application **12** may be configured to permit, or to deny, remote acknowledgement. That is, individual instances of the calendaring application **12**, operating on different devices, may be configured for remote acknowledgement. The device-level configuration option **54** allows the user to individually determine which instance of the calendaring application **12** participates in remote acknowledgement. Recall that the calendaring application **12** is stored in the memory **14** of the communications device **16**. Recall also that the user maintains the second instance **34** of the calendaring application

12 on the home computer 36 and the third instance 38 of the calendaring application 12 on the wireless phone 40. The device-level configuration option 54 allows the user to determine which device participates in remote acknowledgement. The user, for example, may decide that remote acknowledgement is not desirable for the wireless phone 40. Perhaps, for example, the wireless phone 40 has an exposed keypad, so the exposed keys are often inadvertently pushed. Should a reminder be acknowledged by an inadvertent depression of a button, the user would not want that acknowledgement communicated to other instances of the calendaring application 12. The user, then, might decide the risk of inadvertent entries on the exposed keypad is too great, so remote acknowledgement is not desirable for the wireless phone 40.

FIG. 7, then, illustrates the device-level configuration option 54. The device-level configuration option 54 allows the user to individually determine which instance of the calendaring application 12 participates in remote acknowledgement. As FIG. 7 shows, the device-level configuration option 54 allows the user to individually determine i) whether the message 26 is sent from the device with each acknowledgement, and ii) whether messages from other instances are received and processed by the same device. If the user wants the communications device to send the message 26 effectively in real-time with each acknowledgement, the user selects "PERMIT." The calendaring application 12 will then enable features that initiate the message 26 with each acknowledgement of a reminder. If the user does not want the communications device to send the real-time message 26 with each acknowledgement, the user selects "Deny." Similarly, the user determines whether the calendaring application 12 is configured to receive and process messages from other instances/devices. If the user wants the communications device to receive and process effectively real-time messages from other instances/devices, the user selects "PERMIT." The calendaring application 12 will then enable features that receive and process the message 26 from other instances. If the user does not want the communications device to receive/process the real-time message 26, the user selects "Deny." The device-level configuration option 54 thus allows the user to individually determine which instance of the calendaring application 12 participates in remote acknowledgement.

FIG. 8 illustrates a reminder-level configuration option 56. FIG. 8 shows that each reminder may be individually configured to permit, or to deny, remote acknowledgement. Even though the user may configure the calendaring application 12 for remote acknowledgement, the user may decide that some individual calendar entries should not be remotely acknowledged. That is, the user wants to participate in remote acknowledgement, but the user has some calendar entries that should not be remotely acknowledged. A calendar event may be so important (perhaps an important meeting or a spouse's birthday) that the user wants multiple reminders from multiple instances/devices. Even if the user acknowledges the entry at one device, the user wants other instances at other devices to also remind of the calendar entry. The reminder-level configuration option 56 allows the user to individually each calendar entry for remote acknowledgement. Each user, in fact, may establish a user profile that stores custom reminder types from which the user can select. This profile, and its various reminder types, are more fully described in the commonly assigned U.S. patent application Ser. No. 11/068,418, filed Feb. 28, 2005 and since issued as U.S. Pat. No. 7,640,507, which is incorporated herein by reference in its entirety.

The reminder 22 and an expiration may be established according to a profile. As the above paragraphs demonstrate, the event 18, the rule 20, the reminder 22, and an expiration may have many variables that define each component. The user may find it cumbersome, and perhaps even complicated, to configure a calendar entry with all these variables. These concepts, then, also include a profile for different types of reminders. When the user sets a new calendar entry, the user may choose what profile best describes the desired reminder. The user, for example, may define the event, and/or its associated reminder, as "critical." This "critical" profile would automatically establish the parameters that define the rule 18. A "critical" event would have a predefined type of reminder, a predefined pre-event notification interval, a predefined post-start-time reminder interval, and a predefined reminder expiration interval. This "critical" profile, then, would automatically establish what type of reminder is presented for the event. The profile would also automatically establish the date/time at which the reminder is first presented and at what interval the reminder is re-presented to the user. The profile would also automatically establish how and when the reminder is re-presented after the scheduled start of the event and when the reminder expires. Although only a "critical" profile is discussed in detail, the user could choose from several profiles in a menu. The available profiles, for example, could include "critical meeting," "personal reminder," "conference call," "low priority," or any other category. The calendaring application 12 could even permit the user to create/define new profiles, and the user would configure each profile to best suit their needs. When the user creates a new calendared event, the user would simply select the profile that best suits the event. The parameters of the rule associated with the event would then be automatically established. If some parameter does not suit the event, the user could individually modify that parameter to satisfy a specific need.

FIG. 8 illustrates a calendar entry 58. The calendar entry 58 includes the event 18 and the associated rule 20. The rule 20 comprises a date and/or a time at which the event 18 is to occur. The rule 20 may also comprise the reminder 22. The reminder 22 may include at least one of a date and a time at which a notification or an alert is audibly and/or visually presented by the calendar application 12. The calendar entry 58 also includes the reminder-level configuration option 56. The reminder-level configuration option 56 allows the user to individually determine whether the calendar entry 58 participates in remote acknowledgement. If the user wants the communications device to send the message 26 effectively in real-time when the reminder 22 is acknowledged, the user selects "PERMIT." The calendaring application 12 will then enable features that initiate the message 26 when the reminder 22 is acknowledged. If the user does not want the communications device to send the real-time message 26, the user selects "Deny." Similarly, the user determines whether the calendar entry 58 can be remotely acknowledged by another instance of the calendaring application operating on another communications device. If the user wants the reminder 22 to be remotely acknowledged—that is, effectively real-time messages from other instances/devices are received and processed—the user selects "PERMIT." If the user does not want the reminder 22 to be remotely acknowledged, the user selects "Deny." The reminder-level configuration option 56 thus allows the user to individually determine which calendar entries participate in remote acknowledgement.

The calendaring application 12 (whether device-based or in a central server) may also comprise an arbitration mecha-

nism. When the user maintains several instances of their calendar on multiple communications devices, the calendaring application **12** may require some means of arbitrating between instances and/or messages. Because the user maintains several instances of their calendar on multiple communications devices, it is possible that the different instances may conflict. If the user permits one or more instances to participate in remote acknowledgement, it is also possible that the acknowledgement messages **26**, sent from each instance, could conflict. The communications network **28**, for example, might experience different levels and different areas of congestion, thus delaying some acknowledgements more than others. The calendaring application **12**, then, may need some mechanism that arbitrates between conflicting instances and between conflicting messages. One example of an arbitration mechanism is to declare one device to always be the "master." The master device identifies conflicts and queries the user for resolving the conflict.

FIG. **9** is a schematic illustrating one such arbitration mechanism. FIG. **9** illustrates that the calendaring application **12** may use date/time stamps **60** and/or device addresses **62** to arbitrate between conflicting information. FIG. **9** shows a listing **64** of acknowledgements, with each acknowledgement **24** having a corresponding date/time stamp. When the user acknowledges the reminder **22**, that acknowledgement **24** is date and time stamped. That same acknowledgement **24** may also be identified by the device at which the acknowledgement occurred. The listing **64** of acknowledgements, then, shows each acknowledgement **24** having a corresponding date/time stamp and device identifier. The listing **64** of acknowledgements also shows that each acknowledgement **24** also corresponds to its associated calendar event **18**. Each time the calendaring application **12** receives the message **26** from another instance, the calendaring application **12** compares the date/time stamp **60** and/or the device address **62** associated with the message. The calendaring application **12** may then use the date/time stamp **60** and/or the device address **62** to determine whether the message should be processed.

An example might help explain the need for arbitration. Recall that the calendaring application **12** is stored in the memory **14** of the communications device **16**. Recall also that the user maintains the second instance **34** of the calendaring application **12** on the home computer **36** and the third instance **38** of the calendaring application **12** on the wireless phone **40** (as FIGS. **2-5** show). The user has configured the communications device **16**, the home computer **36**, and the wireless phone **40** for remote acknowledgement. So, when the user acknowledges a reminder at one device, that acknowledgement is communicated to the other devices. Now suppose the internal clock sources for each device are slightly different, such that the wireless phone **40** is the first device to present a reminder to the user. The user picks up the wireless phone and dismisses (e.g., acknowledges) the reminder. The wireless phone **40** then communicates that acknowledgement to the communications device **16** and to the home computer **36**. Now, suppose the upload connection data rate of the wireless phone **40** is slower (perhaps much slower) that the download data rate. Before the wireless phone **40** can completely communicate the acknowledgement message **26**, the home computer **36** presents its corresponding reminder. The user enters a keystroke at the home computer **36** to reschedule (e.g., acknowledge) the reminder. The home computer **36** then communicates that acknowledgement to the communications device **16** and to the wireless phone **40**.

This example, then, has conflicting acknowledgements. First, the wireless phone **40** communicates its acknowledgement message while, at the same time (or nearly the same time), the home computer **36** communicates its corresponding acknowledgement message. Which acknowledgement message should the calendaring application accept as authoritative? Second, the user dismissed the reminder at the wireless phone **40**, but at the home computer **36** the user rescheduled the reminder. Which acknowledgement is correct?

The arbitration mechanism resolves such conflicting information. If two or more acknowledgement messages conflict, the arbitration mechanism may use any combination of information to resolve the conflict. The arbitration mechanism, for example, may use the date/time stamp **60** associated with each acknowledgement message. Perhaps the arbitration mechanism is configured to use the earliest date/time stamp as the authoritative acknowledgement. Or, perhaps the latest date/time stamp is authoritative. Perhaps one instance of the calendaring application, operating on a particular device, is the "master" and has precedence over all other instances. That is, the calendaring application **12** operating on the home computer **36** takes precedence over all other instances/devices, such that any acknowledgement messages that conflict with those sent by the home computer **36** are discarded/ignored. The user may even prioritize instances/devices, such that a hierarchy of authority is maintained. Or individual responses have an established hierarchy. As an example, in the event of a conflict, a 'reschedule reminder' should always have priority over a 'dismiss reminder.'

The listing **64** of acknowledgements is also useful to the user. The listing **64** of acknowledgements logs each acknowledgement **24** and its corresponding date/time stamp **60** and the device identifier **62**. The listing **64** of acknowledgements also shows the calendar event **18** that is associated with each acknowledgement **24**. The listing **64** of acknowledgements is thus a helpful user interface that lists transactional activity between instances. When the user, e.g., a human user or software agent, accesses the user interface, the listing **64** of acknowledgements presents a log of acknowledgement activity. The user may thus determine how each reminder was acknowledged, and why calendar instances were remotely acknowledged. If, for example, the user doubts a reminder was acknowledged, the user can consult the listing **64** of acknowledgements and confirm their doubt. The user can thus consult the listing **64** of acknowledgements to see a complete record of acknowledgement transactions, thus helping resolve acknowledgement issues.

FIG. **10** depicts another possible operating environment for the exemplary embodiments. FIG. **10** is a block diagram showing the calendaring application **12** residing in a computer system **70** (such as the communications device **16** shown in FIG. **1**). FIG. **10**, however, may also represent a block diagram of any computer, communications device, or processor-controlled device. The calendaring application **12** operates within a system memory device. The calendaring application **12**, for example, is shown residing in a memory subsystem **72**. The calendaring application **12**, however, could also reside in flash memory **74** or peripheral storage device **76**. The computer system **70** also has one or more central processors **78** executing an operating system. The operating system, as is well known, has a set of instructions that control the internal functions of the computer system **70**. A system bus **80** communicates signals, such as data signals, control signals, and address signals, between the central

processor **78** and a system controller **82** (typically called a "Northbridge"). The system controller **82** provides a bridging function between the one or more central processors **78**, a graphics subsystem **84**, the memory subsystem **72**, and a PCI (Peripheral Controller Interface) bus **86**. The PCI bus **86** is controlled by a Peripheral Bus Controller **88**. The Peripheral Bus Controller **88** (typically called a "Southbridge") is an integrated circuit that serves as an input/output hub for various peripheral ports. These peripheral ports could include, for example, a keyboard port **90**, a mouse port **92**, a serial port **94**, and/or a parallel port **96** for a video display unit, one or more external device ports **98**, and networking ports **100** (such as USB, SCSI, or Ethernet). The Peripheral Bus Controller **88** could also include an audio subsystem **102**. Those of ordinary skill in the art understand that the program, processes, methods, and systems described herein \are not limited to any particular computer system or computer hardware.

One example of the central processor **78** is a microprocessor. Advanced Micro Devices, Inc., for example, manufactures a full line of ATHLON™ microprocessors (ATHLON™ is a trademark of Advanced Micro Devices, Inc., One AMD Place, P.O. Box 3453, Sunnyvale, Calif. 94088-3453, 408.732.2400, 800.538.8450, www.amd.com). The Intel Corporation also manufactures a family of X86 and P86 microprocessors (Intel Corporation, 2200 Mission College Blvd., Santa Clara, Calif. 95052-8119, 408.765.8080, www.intel.com). Other manufacturers also offer microprocessors. Such other manufacturers include Motorola, Inc. (1303 East Algonquin Road, P.O. Box A3309 Schaumburg, Ill. 60196, www.Motorola.com), International Business Machines Corp. (New Orchard Road, Armonk, N.Y. 10504, (914) 499-1900, www.ibm.com), and Transmeta Corp. (3940 Freedom Circle, Santa Clara, Calif. 95054, www.transmeta.com). Those skilled in the art further understand that the program, processes, methods, and systems described herein are not limited to any particular manufacturer's central processor.

According to an exemplary embodiment, the WINDOWS® (WINDOWS® is a registered trademark of Microsoft Corporation, One Microsoft Way, Redmond Wash. 98052-6399, 425.882.8080, www.Microsoft.com) operating system may be used. Other operating systems, however, are also suitable. Such other operating systems would include the UNIX® operating system (UNIX® is a registered trademark of the Open Source Group, www.opensource.org), the UNIX-based Linux operating system, WINDOWS NT®, and Mac® OS (Mac® is a registered trademark of Apple Computer, Inc., 1 Infinite Loop, Cupertino, Calif. 95014, 408.996.1010, www.apple.com). Those of ordinary skill in the art again understand that the program, processes, methods, and systems described herein are not limited to any particular operating system.

The system memory device (shown as memory subsystem **72**, flash memory **74**, or peripheral storage device **76**) may also contain an application program. The application program cooperates with the operating system and with a video display unit (via the serial port **94** and/or the parallel port **96**) to provide a Graphical User Interface (GUI). The Graphical User Interface typically includes a combination of signals communicated along the keyboard port **90** and the mouse port **92**. The Graphical User Interface provides a convenient visual and/or audible interface with a user of the computer system **70**.

FIG. **11** is a schematic illustrating still more exemplary embodiments. FIG. **11** illustrates that the calendaring application **12** may alternatively or additionally operate within various communications devices **16**. FIG. **11**, for example, illustrates that the calendaring application **12** may entirely or partially operate within a personal digital assistant (PDA) **110**, a Global Positioning System (GPS) device **112**, an interactive television **114**, an Internet Protocol (IP) phone **116**, a pager **118**, a cellular/satellite phone **120**, or any computer system and/or communications device utilizing a digital signal processor (DSP) **122**. The communications device **16** may also include watches, radios, vehicle electronics, clocks, printers, gateways, and other apparatuses and systems.

FIGS. **12-14** are schematics further illustrating various communications devices for processing the acknowledgement **24**, according to the exemplary embodiments. FIG. **12** is a block diagram of a Subscriber Identity Module **130**, while FIGS. **13** and **14** illustrate, respectively, the Subscriber Identity Module **130** embodied in a plug **132** and the Subscriber Identity Module **130** embodied in a card **134**. As those of ordinary skill in the art recognize, the Subscriber Identity Module **130** may be used in conjunction with many communications devices (such as the cellular/satellite phone **120** shown in FIG. **11**). The Subscriber Identity Module **130** stores user information (such as the user's International Mobile Subscriber Identity, the user's K_i number, and other user information), the acknowledgement **24**, and any portion of the calendaring application **12**. As those of ordinary skill in the art also recognize, the plug **132** and the card **134** each interface with the communications device according to GSM Standards 2.17 and 11.11 and ISO Standard 7816, with each incorporated herein by reference. The GSM Standard 2.17 is formally known as "European digital cellular telecommunications system (Phase 1); *Subscriber Identity Modules, Functional Characteristics* (GSM 02.17 V3.2.0 (1995-01))." The GSM Standard 11.11 is formally known as "Digital cellular telecommunications system (Phase 2+) (GSM); *Specification of the Subscriber Identity Module—Mobile Equipment* (*Subscriber Identity Module—ME*) *interface* (GSM 11.11 V5.3.0 (1996-07))." Both GSM standards are available from the European Telecommunication Standards Institute (650 route des Lucioles, 06921 Sophia-Antipolis Cedex, FRANCE, Tel.: +33 (0)4 92 94 42 00, Fax: +33 (0)4 93 65 47 16, www.etsi.org). The ISO Standard 7816 is formally known as "*Information technology—Identification cards—Integrated circuit(s) cards with contacts*," and the standard is available from the International Organization for Standardization (ISO) (1, rue de Varembé, Case, postale 56CH-1211 Geneva 20, Switzerland, Telephone+41 22 749 01 11, Telefax+41 22 733 34 30, www.iso.org).

FIG. **12** is a block diagram of the Subscriber Identity Module **130**, whether embodied as the plug **132** of FIG. **13** or as the card **134** of FIG. **14**. Here the Subscriber Identity Module **130** comprises a microprocessor **136** (μP) communicating with memory modules **138** via a data bus **140**. The memory modules may include Read Only Memory (ROM) **142**, Random Access Memory (RAM) and or flash memory **144**, and Electrically Erasable-Programmable Read Only Memory (EEPROM) **146**. The Subscriber Identity Module **130** stores some or all of the calendaring application **12** in one or more of the memory modules **138**. FIG. **12** shows the calendaring application **12** residing in the Erasable-Programmable Read Only Memory **146**, yet the calendaring application **12** could alternatively or additionally reside in the Read Only Memory **142** and/or the Random Access/Flash Memory **144**. An Input/Output module **148** handles communication between the Subscriber Identity Module **130** and the communications device. As those skilled in the art will appreciate, there are many suitable ways for implement-

ing the operation and physical/memory structure of the Subscriber Identity Module. If, however, the reader desires more information on the Subscriber Identity Module, the reader is directed to the following sources: LAWRENCE HARTE et al., GSM SUPERPHONES 99-100, 113-14 (1999); SIEGMUND REDL et al., GSM AND PERSONAL COMMUNICATIONS HANDBOOK 303-69 (1998); and JOACHIM TISAL, GSM CELLULAR RADIO TELEPHONY 99-130 (1997), with each incorporated herein by reference.

FIG. **15** is a schematic further illustrating various communications devices for processing the acknowledgement **24**, according to the exemplary embodiments. FIG. **15** is a block diagram of another communications device **160** utilizing the acknowledgement **24** in the calendaring application **12**. Here the communications device **160** comprises a radio transceiver unit **162**, an antenna **164**, a digital baseband chipset **166**, and a man/machine interface (MMI) **168**. The transceiver unit **162** includes transmitter circuitry **170** and receiver circuitry **172** for receiving and transmitting signals. The transceiver unit **162** couples to the antenna **164** for converting electrical current to and from electromagnetic waves. The digital baseband chipset **166** contains a digital signal processor (DSP) **174** and performs signal processing functions for audio (voice) signals and RF signals. As FIG. **15** shows, the digital baseband chipset **166** may also include an on-board microprocessor **176** that interacts with the man/machine interface (MMI) **168**. The man/machine interface (MMI) **168** may comprise a display device **178**, a keypad **180**, and the Subscriber Identity Module **130**. The on-board microprocessor **176** performs GSM protocol functions and control functions for the radio circuitry **170** and **172**, for the display device **178**, and for the keypad **180**. The on-board microprocessor **176** may also interface with the Subscriber Identity Module **130** and with the calendaring application **12** residing in the memory module **138** of the Subscriber Identity Module **130**. Those skilled in the art will appreciate that there may be many suitable architectural configurations for the elements of the communications device **160**. If the reader desires a more detailed explanation, the reader is invited to consult the following sources: LAWRENCE HARTE et al., GSM SUPERPHONES 105-120 (1999); SIEGMUND REDL et al., GSM AND PERSONAL COMMUNICATIONS HANDBOOK 389-474 (1998); and JOACHIM TISAL, GSM CELLULAR RADIO TELEPHONY 99-130 (1997), with each incorporated herein by reference.

The acknowledgement **24** may be utilized regardless of signaling standard. As those of ordinary skill in the art recognize, FIGS. **12-15** illustrate a Global System for Mobile (GSM) communications device. That is, the communications device utilizes the Global System for Mobile (GSM) communications signaling standard. Those of ordinary skill in the art, however, also recognize the concepts of the acknowledgement **24** are equally applicable to any communications device utilizing the Time Division Multiple Access signaling standard, the Code Division Multiple Access signaling standard, the "dual-mode" GSM-ANSI Interoperability Team (GAIT) signaling standard, or any variant of the GSM/CDMA/TDMA signaling standard.

FIG. **16** is a flowchart illustrating a method of acknowledging a reminder in a calendaring application according to an exemplary embodiment. A calendar entry, corresponding to an event and a rule, is stored (Block **200**). The rule comprises a reminder of the event (Block **202**). The rule may also comprise an element or parameter that permits (Block **204**) or prevents (Block **206**) remotely acknowledging the reminder. The reminder is presented according to the rule (Block **208**). An acknowledgement of the reminder is received (Block **210**) and date/time stamped (Block **212**). A message is prepared by retrieving a destination from memory, with the memory storing a list of destinations at which other instances of the calendaring application reside (Block **214**). The message is then communicated effectively in real-time by a wireless and/or wireline network to similarly acknowledge a pending reminder that corresponds to the same event in another instance of the calendaring application (Block **216**). The message may comprise a request for synchronization in response to the acknowledgement, wherein each acknowledgment requests a corresponding synchronization (Block **218**). The message may or alternatively comprise an instruction to similarly acknowledge the pending reminder in the another instance of the calendaring application (Block **220**). The calendaring application may receive a second message (Block **222**). This second message may indicate the request for synchronization was successful or unsuccessful, the instruction was or was not received at the destination, the pending reminder was similarly acknowledged at the destination, or the instruction was denied by the destination.

The calendaring application (shown as reference numeral **12** in FIGS. **1-14**) may be physically embodied on or in a computer-readable medium. This computer-readable medium may include CD-ROM, DVD, tape, cassette, floppy disk, memory card, and large-capacity disk (such as IOMEGA®, ZIP®, JAZZ®, and other large-capacity memory products (IOMEGA®, ZIP®, and JAZZ® are registered trademarks of Iomega Corporation, 1821 W. Iomega Way, Roy, Utah 84067, 801.332.1000, www.iomega.com). This computer-readable medium, or media, could be distributed to end-users, licensees, and assignees. These types of computer-readable media, and other types not mention here but considered within the scope of the exemplary embodiments, allow the calendaring application to be easily disseminated. A computer program product comprises the calendaring application stored on the computer-readable medium. The calendaring application comprises computer-readable instructions/code for acknowledging a reminder. A calendar entry corresponding to an event and a rule is stored. The rule comprises the reminder of the event. The reminder is presented according to the rule, and an acknowledgement is received. A message is then communicated effectively in real-time to similarly acknowledge a pending reminder that corresponds to the same event in another instance of the calendaring application.

The calendaring application may be physically embodied on or in any addressable (e.g., HTTP, I.E.E.E. 802.11, Wireless Application Protocol (WAP)) wireless device capable of presenting an IP address. Examples could include a computer, a wireless personal digital assistant (PDA), an Internet Protocol mobile phone, or a wireless pager. Those of ordinary skill in the art will recognize that this solution applies to like addressing schemes that may be developed in the future.

While the exemplary embodiments have been described with respect to various features, aspects, and embodiments, those skilled and unskilled in the art will recognize the exemplary embodiments are not so limited. Other variations, modifications, and alternative embodiments may be made without departing from the spirit and scope of the exemplary embodiments.

What is claimed is:

1. A method, comprising:

storing, by a mobile device, a calendar entry associated with an electronic calendaring application;

generating, by the mobile device, a profile menu for display in a graphical user interface associated with the electronic calendaring application, wherein the profile menu presents a plurality of different profiles for a user to associate with a predefined reminder of the calendar entry;

receiving, by the mobile device, a profile selection in the profile menu of a profile of the plurality of different profiles to associate with the predefined reminder of the calendar entry;

determining, by the mobile device, a device-level configuration option in response to the profile selection in the profile menu;

querying, by the mobile device, an electronic database for the profile selected in the profile menu, wherein the electronic database electronically associates a plurality of parameters and the plurality of different profiles associated with the electronic calendaring application including the profile selected in the profile menu;

retrieving, by the mobile device, the plurality of parameters from the electronic database that are electronically associated with the profile selected in the profile menu;

defining, by the mobile device, a predefined rule and a predefined expiration associated with the predefined reminder of the calendar entry based on the plurality of parameters retrieved from the electronic database that are electronically associated with the profile selected in the profile menu;

generating, by the mobile device, a configuration option associated with the calendar entry, wherein the configuration option configures the plurality of parameters according to a remote acknowledgement of the predefined reminder associated with another instance of the electronic calendaring application operating in a different device;

processing, by the mobile device, an alert associated with the predefined reminder of the calendar entry for displaying both the calendar entry and the predefined reminder until the predefined expiration;

receiving, by the mobile device, the remote acknowledgement sent from the another instance of the electronic calendaring application operating in the different device; and

acknowledging, by the mobile device, the alert associated with the predefined reminder of the calendar entry according to the configuration option generated in response to the remote acknowledgement.

2. The method of claim **1**, further comprising receiving a configuration selection associated with the configuration option.

3. The method of claim **1**, further comprising electronically associating the calendar entry to the predefined rule, the predefined reminder, and the predefined expiration.

4. A system, comprising:

a processor; and

a memory device, the memory device storing instructions, the instructions when executed by the processor causing the system to perform operations, the operations comprising:

storing a calendar entry associated with an electronic calendaring application;

generating a profile menu for display in a graphical user interface associated with the electronic calendaring application, wherein the profile menu presents a plurality of different profiles for a user to associate with a predefined reminder of the calendar entry;

receiving a profile selection in the profile menu of a profile of the plurality of different profiles to associate with a predefined reminder of the calendar entry;

determining a device-level configuration option in response to the profile selection in the profile menu;

querying an electronic database for the profile selected in the profile menu, wherein the electronic database electronically associates a plurality of parameters and the plurality of different profiles associated with the electronic calendaring application including the profile selected in the profile menu;

retrieving the plurality of parameters from the electronic database that are electronically associated with the profile selected in the profile menu;

defining a predefined rule and a predefined expiration associated with the predefined reminder of the calendar entry based on the plurality of parameters retrieved from the electronic database that are electronically associated with the profile selected in the profile menu;

generating a configuration option associated with the predefined reminder, wherein the configuration option configures a remote acknowledgement of the predefined reminder associated with another instance of the electronic calendaring application operating in a different device;

processing an alert associated with the predefined reminder of the calendar entry for displaying both the calendar entry and the predefined reminder until the predefined expiration;

receiving the remote acknowledgement sent from the another instance of the electronic calendaring application operating in the different device; and

acknowledging the alert associated with the predefined reminder of the calendar entry according to the configuration option generated in response to the remote acknowledgement.

5. The system of claim **4**, wherein the operations further comprises receiving a configuration selection associated with the configuration option.

6. The system of claim **4**, wherein the operations further comprises electronically associating the calendar entry to the predefined rule, the predefined reminder, and the predefined expiration.

7. A non-transitory computer readable medium storing instructions that when executed by a processor causes the processor to perform operations, the operations comprising:

storing a calendar entry associated with an electronic calendaring application;

generating a profile menu for display in a graphical user interface associated with the electronic calendaring application, wherein the profile menu presents a plurality of different profiles for a user to associate with a predefined reminder of the calendar entry

receiving a profile selection in the profile menu of a profile of the plurality of different profiles to associate with a predefined reminder of the calendar entry;

determining a device-level configuration option in response to the profile selection in the profile menu;

querying an electronic database for the profile selected in the profile menu, wherein the electronic database electronically associates a plurality of parameters and the plurality of different profiles associated with the electronic calendaring application including the profile selected in the profile menu;

retrieving the plurality of parameters from the electronic database that are electronically associated with the profile selected in the profile menu;

defining a predefined rule and a predefined expiration associated with the predefined reminder of the calendar entry based on the plurality of parameters retrieved from the electronic database that are electronically associated with the profile selected in the profile menu;

generating a configuration option associated with the predefined reminder, wherein the configuration option

configures a remote acknowledgement of the predefined reminder associated with another instance of the electronic calendaring application operating in a different device;

processing an alert associated with the predefined reminder of the calendar entry for displaying both the calendar entry and the predefined reminder until the predefined expiration;

receiving multiple remote acknowledgements of the predefined reminder of the calendar entry sent from the other instances of the electronic calendaring application operating in the different devices;

determining a conflict between the multiple remote acknowledgements sent from the other instances of the electronic calendaring application operating in the different devices;

logging time stamps associated with the multiple remote acknowledgements;

determining a master device of the different devices to resolve the conflict between the multiple remote acknowledgements sent from the other instances of the electronic calendaring application operating in the different devices;

arbitrating the conflict based on the time stamps associated with the multiple remote acknowledgements; and

acknowledging the alert associated with the predefined reminder of the calendar entry according to the conflict arbitrated based on the time stamps associated with the multiple remote acknowledgements.

8. The non-transitory computer readable medium of claim **7**, wherein the operations further comprise receiving a configuration selection associated with the configuration option.

* * * * *